

APPENDIX TO THE REPORT OF THE MINISTER OF AGRICULTURE

EXPERIMENTAL FARMS

REPORTS

OF THE

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APPENDIX

TO THE

REPORT OF THE MINISTER OF AGRICULTURE

ON

EXPERIMENTAL FARMS

OTTAWA, December 1, 1902.

SIR,—I beg to submit for your approval the sixteenth annual report of the work done, and in progress, at the several experimental farms.

In addition to my report, you will find appended, reports from the following officers of the Central Experimental Farm: From the Agriculturist, Mr. J. H. Grisdale; from the Horticulturist, Mr. W. T. Macoun; from the Chemist, Mr. Frank T. Shutt, and from the Entomologist and Botanist, Dr. James Fletcher. A report is also submitted from the Poultry Manager, Mr. A. G. Gilbert.

From the Branch Experimental Farms there are reports from Mr. R. Robertson, Superintendent, and from Mr. W. S. Blair, Horticulturist of the Experimental Farm for the Maritime Provinces, at Nappan, Nova Scotia; from Mr. S. A. Bedford, Superintendent of the Experimental Farm for Manitoba, at Brandon; from Mr. Angus Mackay, Superintendent of the Experimental Farm for the North-west Territories, at Indian Head, and from Mr. Thos. A. Sharpe, Superintendent of the Experimental Farm for British Columbia, at Agassiz.

In these reports there will be found the results of many important and carefully conducted experiments in agriculture, horticulture and arboriculture, the outcome of practical work in the fields, barns, dairy and poultry buildings, orchards and plantations at the several experimental farms; also of scientific investigations in the chemical laboratory and of information gained from the careful study of the life histories and habits of injurious insects and the methods by which noxious weeds are propagated and spread, together with the most practical and economical measures for their destruction. In the report of the Entomologist and Botanist will also be found particulars of the experiments and observations which have been made during the past year in connection with the Apiary.

2-3 EDWARD VII., A. 1903

The large and constantly increasing demand by the farmers of the Dominion for the publications issued from the experimental farms and the rapidly extending correspondence is a gratifying evidence of the desire for information among this class of the community, also of the high esteem in which the records of the work of the farms are held. It is hoped that the facts brought together in the present issue will be found of much practical value to the Canadian farmer and fruit-grower and that they may assist in advancing agriculture and horticulture in this country.

I have the honour to be, sir,

Your obedient servant,

WM. SAUNDERS,

Director of Experimental Farms.

To the Honourable

The Minister of Agriculture,
Ottawa.

ANNUAL REPORT

ON THE

EXPERIMENTAL FARMS.

REPORT OF THE DIRECTOR, WM. SAUNDERS, LL.D., F.R.S.C., F.L.S.

The farmers of the Dominion of Canada have good reason to be satisfied with the results of the harvest of 1902. Seldom have the crops been so generally good. Both from the east and the west have come gratifying reports of the exceptionally good character of the harvest.

In Ontario the yield of hay has been excellent, and oats—now much the largest of the grain crops—have given the heaviest returns on record, averaging from 20 to 25 per cent above past years, and the grain is unusually good. Ontario also rejoices in a heavy crop of winter wheat much above the average, a crop almost free this year from insect injury and but little affected by rust. Spring wheat and barley have also given gratifying returns.

In the benefits arising from abundant crops of these important cereals, Quebec, the Maritime Provinces and the Western Provinces and Territories have largely shared; indeed it is doubtful if the farmers of Canada have ever experienced a season so generally satisfactory as that of 1902. In addition to the abundant crops of grain and hay the pastures have been excellent, and thus the dairy and stock industries have also prospered. In the Eastern Provinces and in British Columbia the yield of field roots has been satisfactory, and potatoes which in some districts have suffered from rot have on the whole yielded well.

Pease have been much injured in many localities by the curculio or pea weevil, and the crops of Indian corn owing to the cool summer have not matured as well as usual but these are comparatively small items in the products of the country, and present no serious offset to the abundant crops of cereals and grasses.

It is gratifying to note the rapid improvement going on in all lines of agriculture in Canada. Farmers are paying more attention to the thorough cultivation of the soil, to the proper care and use of barn-yard manure, to the enriching of their land by the ploughing under of clover, also to the selection of the most productive sorts of grain for sowing. The unusually large crop of the past season, while due no doubt in part to favourable weather is also due in part to better conditions brought about by more intelligent farming.

For sixteen years past the Dominion Experimental Farms have enlisted the co-operation of a great host of farmers from the Atlantic to the Pacific in a general experimental testing of promising varieties of grain and other important farm crops, with the view of ascertaining which are best adapted to the varying climates and soils found in different parts of this country. During the past seven years an average of more than thirty thousand Canadian farmers have thus associated themselves each year with the Experimental Farms. Seven years' experience with such an army of workers, backed as it has been by continued and helpful tests at the experimental farms and the distribution of much information on the subject, has resulted in the introduction almost everywhere of better and more productive sorts of cereals, and this has doubtless been an important factor in the large harvest of 1902. Where difficulties present themselves in farm work, the farmer can consult the publications he receives from the experimental farms and if these do not give him all the information he needs he can write the officers of the farms whose large experience is at his command and from whom he will receive advice suited to his conditions. By the free use of such timely aid, always available, together with the other helpful measures devised both by the Dominion and Provincial Governments the farmers of this country are advancing rapidly in intelligence and experience, and the outlook for much greater progress in agricultural affairs is very bright.

The accompanying annual report, the sixteenth of the series, will be found to contain a large amount of practical information which it is hoped will be helpful to farmers in every part of Canada.

EXPERIMENTAL WORK

CONDUCTED AT THE CENTRAL EXPERIMENTAL FARM
OTTAWA, ONTARIO.

EXPERIMENTS WITH OATS.

Ninety-seven varieties of oats have been under trial at the Central Experimental Farm during 1902, for the purpose of ascertaining which are the most productive, and which are the earliest in ripening. The soil on which these oats were sown was very uniform in character, a clay loam of good quality more or less mixed with sandy loam. The previous crop was field roots. The land received a dressing during the winter of 1900-1901 of about twelve tons of fresh barn-yard manure per acre, which was placed on the frozen ground in small heaps of about one-third of a cart load each, and spread and ploughed under in the spring. No manure has been applied since. In the autumn of 1901 after the roots were gathered, the land was ploughed about seven inches deep and left in that condition until the following spring, when it was cultivated twice with a two-horse cultivator and harrowed twice with the smoothing harrow before the oats were sown.

Seventy-one of these varieties were sown on April 18, the remainder on April 22 on plots of one-fortieth of an acre each. The seed used in each case was in the proportion of two bushels per acre.

By consulting the following table it will be seen that oats have given above an average crop this year. Forbes, one of the new cross-bred sorts introduced last year, a cross of Giant Cluster with Prize Cluster, stands second on the list at Ottawa with a yield of 85 bushels 30 lbs. per acre.

OATS—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.	Number of days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Rusted.	
				Inches.		Inches.		Bush.	Lbs.			
1	Improved American.	Aug.	14	118	54—56	Stiff.....	8½—10	Branching	90	20	33	Slightly.
2	Forbes	"	25	125	56—58	Medium..	9½—11	Sided.....	85	30	32½	Badly.
3	Sensation	"	12	116	56—58	Weak ...	8¾—10	Branching	83	18	34	"
4	White Russian. ...	"	13	117	50—52	Medium..	8 — 9½	"	83	18	33	"
5	Siberian.....	"	14	118	52—54	Stiff.....	10 — 11	"	82	12	30½	Considerably.
6	Atlantic.....	"	12	112	47—49	Medium..	8 — 9½	"	82	12	33	Badly.
7	Banner.....	"	10	114	51—53	" ..	8½—9½	"	81	6	30	"
8	Columbus.....	"	12	116	50—52	Weak	7 — 8½	"	81	6	30½	"
9	Flying Scotchman...	"	13	117	50—52	Medium..	8½—10	"	80	—	32	"
10	Salzer's Big Four....	"	14	118	52—54	Stiff.....	8½—10	"	78	28	31½	Slightly.
11	New Zealand.....	"	19	123	58—60	"	12½—13½	Sided. ...	77	22	35	Considerably.
12	White Giant.....	"	13	117	56—58	"	9½—10½	Branching	77	22	29½	"
13	Holstein Prolific	"	13	117	52—54	Medium..	8½—10	"	77	22	30¼	"
14	Early Golden Prolific	"	13	117	48—50	Weak	9½—11	"	77	22	28½	Badly.
15	Virginia White Abundance.	"	11	111	46—48	"	8 — 9½	"	77	22	32½	"
16	Probstey	"	12	112	52—54	Stiff.....	9½—10½	"	77	22	34	"
17	Golden Beauty.....	"	9	113	50—52	"	8½—10	"	76	16	32½	"
18	Newmarket	"	7	111	48—50	Medium..	8 — 9½	"	76	16	33	"
19	Hazlett's Seizure....	"	14	118	55—57	Stiff.....	10 — 11½	"	75	10	33½	Slightly.
20	Danish Island	"	12	116	51—53	Medium..	8½—10	"	75	10	29	Badly.
21	Buckbee's Illinois...	"	12	116	53—55	" ..	8 — 9½	"	75	10	35	Considerably.
22	Anderbecker ..	"	12	112	48—50	" ..	8½—10	"	75	10	32½	Badly.
23	20th Century	"	13	117	50—52	Stiff.....	9½—10½	"	72	32	31	Considerably.
24	Mennonite.....	"	14	118	50—52	Weak	9 — 10½	"	72	31	30	Badly.
25	Waverley	"	12	116	58—60	Stiff.....	9 — 10½	"	71	26	31½	"
26	Bestehorn's Abund'ce	"	13	113	48—50	Medium..	8 — 9½	"	71	26	30	"
27	Australian	"	22	122	50—52	Stiff.....	10 — 11½	Sided.....	71	26	33½	Slightly.
28	White Schonen.....	"	13	117	50—52	"	8½—10	Branching	70	20	32	Considerably.
29	Joanette	"	11	115	44—46	Medium..	8 — 9½	"	70	20	35	"
30	Brandon	"	14	118	58—60	Weak	10½—12	Half sided	70	20	30½	"
31	Cream Egyptian	"	12	116	56—58	Stiff.....	9 — 10½	"	70	20	31½	Badly.
32	American Beauty....	"	7	111	50—52	"	8½—10	Branching	69	14	35½	"
33	Irish Victor.....	"	13	117	50—52	"	8 — 9½	"	69	14	33	Considerably.
34	Scottish Chief.....	"	10	110	48—50	Medium..	8½—10	"	69	14	34	Badly.
35	Wide Awake.....	"	12	116	49—51	Stiff.....	9 — 10½	"	68	8	31	"
36	Early Gothland.	"	12	116	47—49	Medium..	10 — 11½	Half sided	68	8	28	"
37	American Triumph..	"	13	117	52—54	Stiff.....	8 — 9½	Branching	68	8	30	"
38	Abundance.....	"	13	117	49—51	"	8½—10	"	67	2	31	Considerably.
39	Improved Ligowo...	"	10	114	44—46	"	7 — 8½	"	67	2	36½	Badly.
40	Goldfinder.....	"	14	118	46—48	"	8 — 9½	Half sided	65	30	28	"
41	Lincoln.....	"	13	117	53—55	"	8½—9½	Branching	65	30	31½	"
42	Selchower	"	14	114	56—58	"	9½—11	Sided.....	65	30	31	"
43	Great Northern ..	"	14	114	53—55	Medium..	8½—10	Branching	65	30	28	"
44	Bavarian.. ...	"	13	117	52—54	Stiff.....	8½—10	"	64	24	31	"
45	Black Beauty.....	"	13	117	50—52	Medium..	8½—10	"	64	24	31	Considerably.
46	Kendal Black.....	"	13	117	56—58	Stiff.....	9 — 10½	Half sided	64	24	35	Badly.
47	Salines	"	19	123	61—63	Medium..	9½—11	Branching	64	24	30	Considerably.
48	Holland.....	"	19	123	57—59	" ..	11 — 12½	Sided. ...	64	24	27	Badly.
49	Pense White.....	"	13	113	48—50	" ..	8 — 9½	Half sided	63	18	30	"
50	Prolific Black Tartarian	"	13	117	52—54	Stiff.....	8½—10	Sided.	63	18	33	"
51	Wallis.....	"	7	111	52—54	Medium..	9 — 11	Branching	63	18	34	"
52	Early Maine.....	"	13	117	50—52	Stiff.....	9 — 10½	"	62	12	30	"
53	Olive, Black.....	"	13	117	57—59	Medium..	10 — 11½	Half sided	62	12	33½	"
54	Pense, Black.....	"	12	116	58—60	Stiff.....	10 — 11½	"	62	12	35	"
55	Master	"	14	118	50—52	Medium..	10 — 11½	"	62	12	30	"
56	Russell, Half Sided..	"	13	113	55—57	" ..	10½—12	"	62	12	30	"
57	Duppaner Summer, No. 5	"	16	116	49—51	Stiff.....	9 — 10½	Branching	62	12	33	Considerably.
58	Thousand Dollar....	"	13	117	50—52	"	8½—10	"	61	6	33	Badly.
59	Golden Tartarian....	"	19	123	59—61	"	12 — 13½	Sided.....	61	6	29	"
60	Bayonet	"	16	116	48—50	Medium..	8½—10	Branching	61	6	30	Considerably.

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OATS—TEST OF VARIETIES—*Concluded.*

Number.	Name of Variety.	Date of Ripening.	Number of days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
								Bush.	Lbs.		
				Inches.		Inches.				Lbs.	
61	Golden Giant.	Aug. 18	122	54—56	Stiff	10 — 11½	Sided.	61	6	28½	Considerably.
62	Bonanza	" 7	111	49—51	Weak	10 — 11½	Branching	60	—	32½	Badly.
63	Milford, Black	" 13	117	51—53	Stiff	9 — 11	Half sided	60	—	34½	"
64	Early Blossom	" 15	119	54—56	Medium..	9½—11	"	60	—	27	"
65	Milford, White.....	" 15	119	53—55	Stiff	9½—10½	"	60	—	33	"
66	Überfluss	" 14	114	50—52	"	9½—10½	Branching	60	—	32	Considerably.
67	Russell, Branching..	" 18	118	53—55	Medium..	11 — 12½	"	60	—	32	"
68	Leutenwitzer.....	" 12	116	51—53	" ..	10 — 11½	"	60	—	30½	Badly.
69	Oderbruch	" 14	118	56—58	" ..	9½—11	Half sided	58	28	29	"
70	Black Mesdag	" 2	106	47—49	" ..	9 — 10	Branching	58	28	30½	"
71	Tartar King	" 10	114	53—55	Stiff	10 — 11½	Sided.	56	16	36	"
72	Abyssinia	" 13	117	53—55	Medium..	8½—10	Half sided	56	16	33½	"
73	California Prolific, Black	" 14	118	52—54	Stiff	10 — 11½	Sided.	56	16	32	"
74	Sorgenfrei	" 12	112	46—48	Weak	8½—10	Branching	56	16	35	"
75	Swedish Select No. 2788	" 19	119	48—50	Medium..	8½— 9½	"	56	16	34	Considerably.
76	Oxford	" 13	117	51—56	Weak	11 — 12	Half sided	56	16	31½	"
77	King	" 13	117	50—52	Stiff	9 — 10½	Branching	56	16	28½	"
78	Aitken Black	" 14	118	53—55	Weak	11½—13½	"	56	16	30	Badly.
79	Black No. 6 Summer	" 14	114	58—60	Stiff	9½—10	Sided.	55	10	26½	"
80	Rosedale	" 13	117	51—53	"	9 — 10½	Half sided	55	10	31½	"
81	Early Archangel....	" 14	118	53—55	"	11 — 12½	Branching	54	4	35½	"
82	Olive, White.....	" 16	116	56—58	Medium..	9 — 10½	Half sided	54	4	30	Considerably.
83	Rennie's Prize White	" 14	114	44—46	Stiff	8 — 9½	Branching	54	4	34	Badly.
84	Cromwell	" 14	118	53—55	"	11½—13	Half sided	54	4	33	"
85	Pioneer	" 10	114	44—46	"	9 — 10½	Branching	54	4	33	"
86	Miller	" 13	117	51—53	Medium..	8½—10	"	54	4	30	"
87	Beseler	" 13	117	56—58	Stiff	10½—12	"	52	32	32	"
88	Russell	" 14	118	56—58	Weak	10½—12	"	52	32	33½	"
89	Victoria Prize	" 7	111	46—48	"	9½—10½	"	52	32	33	"
90	Dixon	" 15	115	58—60	Stiff	9½—10½	Sided.	50	20	32½	"
91	Kendal White	" 16	116	50—52	"	9½—10½	Half sided	50	20	34	Considerably.
92	Zhelanni, No. 2963..	" 13	113	51—53	Weak	10 — 11½	Branching	50	20	26½	Badly.
93	Eureka	" 18	118	44—46	Medium..	8½—10	"	48	8	32	Considerably.
94	Liberty	" 20	120	51—53	" ..	9½—11	"	45	30	29	"
95	Tobolsk No. 2800....	" 13	117	54—56	Weak	10 — 11½	"	45	30	31½	Badly.
96	Scotch Potato.	" 17	121	58—60	"	9½—10½	"	36	16	28	Considerably.
97	Longhoughton... ..	" 16	120	53—55	"	11 — 12½	"	31	26	33	Badly.

EXPERIMENTS WITH BARLEY.

Seventy-three different sorts of barley have been tested in the trial plots at the Central Experimental Farm during 1902. Thirty-one of these have been two-rowed sorts and forty-two six-rowed. The land on which the barley was sown, was adjoining that used for oats and was of the same character and quality and had similar manuring and preparation. The size of the plots was one-fortieth of an acre each, fifty of them were sown on April 17, the remainder on April 21. The two-rowed sorts were sown at the rate of two bushels per acre, and the six-rowed at the rate of one and three-quarter bushels per acre.

It will be seen that both the two-rowed and six-rowed sorts have given larger crops than usual.

TWO-ROWED BARLEY—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
				Inches.		Inches.	Bush.	Lbs.		
1	French Chevalier.....	Aug.	4	109	47—49	Medium....	2 $\frac{3}{4}$ —3 $\frac{1}{4}$	68 16	53	Slightly.
2	Danish Chevalier.....	"	4	109	49—51	"	4 $\frac{1}{2}$ —5	64 8	50	"
3	Canadian Thorpe.....	"	4	109	46—48	Stiff.....	2 $\frac{1}{2}$ —3	62 24	53 $\frac{1}{2}$	No rust.
4	Fichtel Mountain.....	"	5	106	40—42	Medium....	4—4 $\frac{1}{2}$	60 40	53	Slightly.
5	Kinver Chevalier.....	"	3	108	50—52	Weak	4 $\frac{1}{2}$ —5	60 ..	50 $\frac{1}{2}$	"
6	Duck-bill.....	"	9	110	40—42	Stiff.....	3 $\frac{1}{2}$ —4	56 32	49	"
7	Gordon.....	"	4	109	50—52	Medium....	2 $\frac{1}{2}$ —3 $\frac{1}{4}$	55 40	51	"
8	Fulton.....	"	3	108	53—55	"	2 $\frac{3}{4}$ —3 $\frac{1}{4}$	55 ..	52	"
9	Logan.....	"	4	109	56—58	"	4—4 $\frac{1}{2}$	54 8	50 $\frac{1}{2}$	"
10	Bolton.....	July	31	105	50—52	"	4—4 $\frac{1}{2}$	53 16	53	"
11	Dunham.....	Aug.	4	109	52—54	"	3 $\frac{3}{4}$ —4 $\frac{1}{4}$	53 16	51	"
12	Beaver.....	July	31	105	52—54	"	3 $\frac{1}{2}$ —4 $\frac{1}{4}$	52 24	51 $\frac{1}{2}$	"
13	Pelham.....	Aug.	1	102	41—43	Stiff.....	3 $\frac{3}{4}$ —4 $\frac{1}{4}$	52 24	52 $\frac{1}{2}$	"
14	Newton.....	"	6	111	47—49	"	3—3 $\frac{3}{4}$	50 40	54 $\frac{1}{2}$	"
15	Standwell.....	"	5	110	46—48	"	3—3 $\frac{1}{2}$	50 ..	51 $\frac{1}{2}$	"
16	Victor.....	July	31	105	50—52	"	4—4 $\frac{1}{2}$	48 16	52 $\frac{1}{2}$	"
17	Harvey.....	Aug.	4	109	52—54	"	3 $\frac{1}{2}$ —4 $\frac{1}{4}$	48 16	51 $\frac{1}{2}$	"
18	Pacer.....	"	1	102	48—50	Medium....	3 $\frac{1}{2}$ —4	48 16	52 $\frac{1}{2}$	"
19	Sidney.....	"	3	108	49—51	Weak	3 $\frac{1}{4}$ —4	46 32	52	"
20	Prize Prolific.....	"	7	112	43—45	"	4—4 $\frac{1}{2}$	46 32	49 $\frac{1}{2}$	"
21	Monck.....	"	12	113	47—49	Medium....	3—3 $\frac{1}{2}$	46 32	50 $\frac{1}{2}$	Considerably.
22	Nepean.....	July	31	105	46—48	Stiff.....	3—3 $\frac{1}{4}$	46 32	53	Slightly.
23	Clifford.....	"	31	105	55—57	"	3—3 $\frac{1}{2}$	46 32	53	"
24	Invincible.....	Aug.	6	111	44—46	"	3—3 $\frac{3}{4}$	45 40	54	"
25	Oregon.....	"	12	113	41—43	Medium....	4 $\frac{1}{2}$ —5	45 40	48	Badly.
26	Jarvis.....	"	2	107	54—56	Stiff.....	4—4 $\frac{1}{2}$	45 ..	51	Slightly.
27	Plumage from Norway....	"	12	113	40—42	"	3—3 $\frac{3}{4}$	41 32	52	"
28	Bestehorn's Kaiser.....	"	21	122	44—46	Medium....	3 $\frac{1}{2}$ —3 $\frac{3}{4}$	41 32	51	"
29	Leslie.....	"	4	109	47—49	Stiff.....	4—4 $\frac{1}{2}$	39 8	52	"
30	Improved Thanet.....	"	19	120	32—34	Medium....	4 $\frac{1}{4}$ —4 $\frac{3}{4}$	24 8	47 $\frac{1}{2}$	"
31	Rigid.....	"	19	120	39—41	"	3 $\frac{3}{4}$ —4 $\frac{1}{2}$	22 24	50 $\frac{1}{2}$	"

SIX-ROWED BARLEY—TEST OF VARIETIES.

1	Blue Long Head.....	Aug.	3	108	38—40	Medium....	2 $\frac{1}{2}$ —3	74 8	46	Slightly.
2	Yale.....	July	31	105	50—52	Weak	2 $\frac{1}{4}$ —2 $\frac{3}{4}$	73 16	51	"
3	Trooper.....	"	29	103	51—53	Medium....	3 $\frac{1}{4}$ —3 $\frac{3}{4}$	65 40	51 $\frac{1}{2}$	"
4	Stella.....	"	31	105	46—48	"	2 $\frac{1}{2}$ —3	65 40	51 $\frac{1}{2}$	"
5	Odessa.....	"	30	104	54—56	Stiff.....	3 $\frac{1}{4}$ —3 $\frac{3}{4}$	65 ..	51	"
6	Mensury.....	"	31	105	52—54	Medium....	3 $\frac{1}{4}$ —4	64 8	50	"
7	Hulless Black.....	"	30	104	36—38	Weak	2—2 $\frac{1}{4}$	63 16	61 $\frac{1}{2}$	"
8	Surprise.....	"	30	104	46—48	Medium....	2 $\frac{1}{4}$ —2 $\frac{3}{4}$	63 16	52	"
9	Nugent.....	Aug.	1	106	50—52	"	3—3 $\frac{1}{2}$	60 40	48	"
10	Brome.....	"	2	107	49—51	Weak	3 $\frac{1}{2}$ —4	60 40	51	"
11	Pioneer.....	"	2	107	49—51	Stiff.....	3 $\frac{1}{4}$ —4	60 ..	49	"
12	Princess Sialof.....	"	9	110	38—40	"	4—4 $\frac{1}{2}$	58 16	51	Considerably.
13	Hulless White.....	July	26	100	39—41	Medium....	2 $\frac{1}{2}$ —3	57 24	61	Slightly.
14	Salzer's Silver King....	Aug.	1	102	44—46	Weak	3—3 $\frac{1}{2}$	55 40	50	"
15	Garfield.....	July	30	104	49—51	Medium....	2 $\frac{1}{4}$ —2 $\frac{3}{4}$	55 ..	51 $\frac{1}{2}$	"
16	Petschora.....	Aug.	1	106	43—45	Weak	2 $\frac{3}{4}$ —3 $\frac{1}{4}$	53 16	47 $\frac{1}{2}$	"
17	Oderbruch.....	July	30	104	44—46	Stiff.....	2 $\frac{1}{2}$ —3	52 24	52 $\frac{1}{2}$	"
18	Argyle.....	Aug.	4	109	49—51	Weak	2 $\frac{1}{2}$ —3	51 32	50	"
19	Success.....	July	27	101	40—42	Medium....	2 $\frac{1}{2}$ —3	50 40	47 $\frac{1}{2}$	"
20	Sisolsk Spring No. 2962...	"	30	100	44—46	"	3—3 $\frac{1}{2}$	50 40	48 $\frac{1}{2}$	"
21	Common.....	"	30	104	40—42	"	2 $\frac{1}{2}$ —3	50 40	52	"
22	Munro.....	"	30	100	38—40	"	2 $\frac{1}{2}$ —3	50 40	51	"
23	Vanguard.....	"	29	103	45—47	"	3 $\frac{3}{4}$ —4 $\frac{1}{4}$	50 40	50 $\frac{1}{2}$	"
24	Rennie's Improved.....	"	30	104	46—48	Weak	2 $\frac{1}{4}$ —2 $\frac{3}{4}$	49 8	51	"
25	Lytton.....	"	31	101	39—41	"	3—3 $\frac{1}{2}$	49 8	50 $\frac{1}{2}$	Considerably.
26	Excelsior.....	"	27	101	50—52	Stiff....	3 $\frac{1}{4}$ —3 $\frac{3}{4}$	48 16	45	Slightly.
27	Royal.....	"	29	103	45—47	"	3 $\frac{3}{4}$ —4 $\frac{1}{4}$	47 24	51 $\frac{1}{2}$	"
28	Albert.....	"	30	104	45—47	Medium....	3—3 $\frac{1}{2}$	47 24	52 $\frac{3}{4}$	"
29	Summit.....	"	29	103	47—49	Stiff.....	3 $\frac{1}{2}$ —4	47 24	51 $\frac{1}{2}$	"

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SIX-ROWED BARLEY—TEST OF VARIETIES—*Concluded.*

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
				Inches.		Inches.	Bush.	Lbs.		
30	Mansfield.....	Aug. 4	109	46—48	Medium....	3 — 3 $\frac{1}{2}$	46	32	50 $\frac{1}{2}$	Slightly.
31	Empire.....	" 1	106	44—46	"	2 $\frac{3}{4}$ —3 $\frac{1}{4}$	46	32	51 $\frac{1}{2}$	"
32	Champion.....	July 27	101	50—52	Stiff.....	3 — 3 $\frac{1}{2}$	45	40	46	"
33	Parkin.....	Aug. 1	102	40—42	Weak	2 $\frac{3}{4}$ —3 $\frac{1}{4}$	45	40	45	"
34	No. 8 from Norway.....	" 1	102	40—42	"	2 $\frac{3}{4}$ —3 $\frac{1}{4}$	45	..	49	"
35	Beardless from Salzer.....	July 27	97	44—46	Medium....	2 $\frac{1}{2}$ —3	44	8	45 $\frac{1}{2}$	"
36	Chinese Hulless.....	Aug. 3	104	37—39	Weak	2 $\frac{1}{2}$ —2 $\frac{3}{4}$	40	..	61	"
37	Hordeum Chousk (Hulless).....	July 28	98	24—26	"	2 $\frac{1}{2}$ —2 $\frac{3}{4}$	40	..	57	"
38	Claude.....	" 31	105	45—47	Stiff.....	2 $\frac{3}{4}$ —3 $\frac{1}{4}$	37	24	50 $\frac{1}{2}$	"
39	Turkestan.....	" 28	98	22—24	Weak	2 $\frac{3}{4}$ —3 $\frac{1}{4}$	36	32	55 $\frac{1}{2}$	"
40	Phoenix.....	" 29	103	42—44	Medium....	2 $\frac{1}{2}$ —2 $\frac{3}{4}$	36	32	52	"
41	Baxter	" 29	103	45—47	"	2 $\frac{3}{4}$ —3 $\frac{1}{4}$	35	..	51 $\frac{1}{2}$	"
42	Blue Short Head.....	Aug. 16	117	28—30	Stiff.....	2 — 2 $\frac{1}{2}$	27	24	41	Considerably.

EXPERIMENTS WITH SPRING WHEAT.

One hundred and nineteen varieties of this grain were under trial during 1902. The soil was adjoining that on which the oats were grown, was similar in character and quality and received the same treatment and preparation. Most of the varieties were sown on April 15, the remainder on April 21. The size of the plots was one-fortieth of an acre each and the grain was sown in the proportion of 1 $\frac{1}{2}$ bushels per acre.

SPRING WHEAT—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
				Inches.		Inches.		Bush.	Lbs.		
1	Pringle's Champlain.	Aug. 8	115	54—56	Medium..	2 $\frac{1}{2}$ —3 $\frac{1}{4}$	Bearded..	46	—	61 $\frac{1}{2}$	Badly.
2	Dawson	" 15	122	58—60	Stiff.....	4 $\frac{1}{2}$ —5 $\frac{1}{2}$	Beardless.	44	40	61	Slightly.
3	Rio Grande.....	" 13	120	58—60	"	4 $\frac{1}{2}$ —5 $\frac{1}{2}$	Bearded..	44	—	63 $\frac{1}{2}$	"
4	Preston.....	" 8	115	55—57	"	3 $\frac{1}{2}$ —4 $\frac{1}{2}$	" ..	43	20	63	"
5	Huron.....	" 15	122	54—56	"	4 $\frac{1}{2}$ —5 $\frac{1}{2}$	" ..	42	40	62	"
6	Red Fern.....	" 15	122	52—54	"	4 — 4 $\frac{1}{2}$	" ..	42	40	62 $\frac{1}{2}$	"
7	Roumanian.....	" 17	124	56—58	Medium..	2 $\frac{3}{4}$ —3 $\frac{1}{4}$	" ..	42	40	64	"
8	White Russian..	" 16	123	54—56	Stiff	4 — 4 $\frac{1}{2}$	Beardless.	42	—	60 $\frac{1}{2}$	"
9	Herisson Bearded...	" 16	123	49—51	Medium..	2 $\frac{1}{2}$ —2 $\frac{3}{4}$	Bearded..	42	—	63 $\frac{1}{2}$	"
10	Admiral.....	" 15	122	58—60	"	4 $\frac{1}{2}$ —5	Beardless.	42	—	60 $\frac{1}{2}$	"
11	Blenheim.....	" 14	121	59—61	Stiff	3 $\frac{1}{2}$ —4 $\frac{1}{2}$	Bearded..	42	—	61	"
12	Hungarian.....	" 14	121	55—57	Medium..	3 $\frac{1}{2}$ —4 $\frac{1}{2}$	" ..	40	40	62 $\frac{1}{2}$	Considerably.
13	Dawn	" 8	115	56—58	Stiff.	3 $\frac{1}{2}$ —4	Beardless.	40	40	63 $\frac{1}{2}$	Slightly.
14	Crown	" 11	118	58—60	"	4 — 4 $\frac{1}{2}$	Bearded..	40	40	60 $\frac{1}{2}$	"
15	Crawford.....	" 8	115	53—55	"	3 — 3 $\frac{1}{4}$	Beardless.	40	40	62	"
16	Laurel.....	" 13	120	58—60	"	4 $\frac{1}{2}$ —5 $\frac{1}{2}$	" ..	40	40	60 $\frac{1}{2}$	"
17	Bishop.....	" 8	115	51—53	"	3 $\frac{1}{2}$ —4 $\frac{1}{2}$	" ..	40	40	61	Considerably.
18	Percy.....	" 8	115	58—60	"	3 $\frac{1}{2}$ —4 $\frac{1}{2}$	" ..	40	—	62	"
19	Countess	" 11	118	53—55	"	3 — 3 $\frac{1}{2}$	" ..	40	—	61	"
20	Monarch.....	" 16	123	54—56	"	3 $\frac{1}{2}$ —4 $\frac{1}{2}$	" ..	39	20	61	Slightly.

SPRING WHEAT—TEST OF VARIETIES—*Continued.*

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre		Weight per Bushel.	Rusted.
				Inches.		Inches.		Bush.	Lbs.	Lbs.	
21	Plumper	Aug. 13	120	53-55	Weak	3½-4½	Bearded. .	39	20	62	Slightly.
22	Ebert	" 3	110	50-54	Stiff	3-3½	Beardless. .	39	20	61	"
23	Red Fife	" 14	121	53-55	"	4-4½	" ..	38	40	61	"
24	White Fife	" 15	122	56-58	"	4-4½	" ..	38	40	61	"
25	Dion's	" 14	121	56-58	"	3½-4½	Bearded. .	38	40	63	"
26	Vernon	" 16	123	54-56	Medium..	3½-4½	" ..	38	40	61	Considerably.
27	Campbell's White Chaff	" 14	121	54-56	Stiff	3½-4½	Beardless. .	38	—	62	Slightly.
28	Benton	" 15	122	55-57	Weak	3½-4½	" ..	38	—	61½	"
29	Byron	" 15	122	52-54	Medium..	4-4½	Bearded. .	38	—	62½	"
30	Clyde	" 17	124	58-60	" ..	4-4½	Beardless. .	38	—	61	Considerably.
31	Essex	" 18	125	57-59	" ..	3½-4½	" ..	38	—	62½	Slightly.
32	Prospect	" 14	121	53-55	Weak	3½-4½	" ..	38	—	62½	"
33	Minnesota No. 149...	" 16	123	48-50	Stiff	4-4½	" ..	38	—	62	"
34	Australian No. 19...	" 16	123	51-53	"	4½-5½	" ..	38	—	61	"
35	White Connell	" 15	122	48-50	"	3½-4½	" ..	37	20	61½	"
36	Japanese	" 12	119	50-52	"	2½-3½	Bearded. .	37	20	61½	"
37	Robin's Rust Proof..	" 15	122	58-60	Medium..	3½-4½	Beardless. .	37	20	62½	"
38	Minnesota No. 181...	" 15	122	54-56	Stiff	4½-5½	" ..	37	20	60	"
39	Australian No. 13...	" 17	124	50-52	"	4½-4½	" ..	37	20	60½	"
40	Colorado	" 11	118	53-58	Medium..	3-3½	Bearded. .	36	40	62½	Badly.
41	Hastings	" 7	114	57-59	Stiff ...	3½-4½	Beardless. .	36	40	62½	Considerably.
42	Rideau	" 6	113	49-51	Weak	3-3½	" ..	36	40	60	Badly.
43	Advance	" 14	121	56-58	Stiff	4-4½	Bearded. .	36	40	61½	Slightly.
44	Progress	" 15	122	58-60	"	4½-5½	Beardless. .	36	40	60½	"
45	Nixon	" 15	122	56-58	Medium..	4-4½	" ..	36	40	61	"
46	Minnesota No. 169...	" 15	122	51-53	Stiff	4-4½	" ..	36	40	61	"
47	Minnesota No. 163...	" 16	123	53-55	"	4½-5½	" ..	36	40	61	"
48	Mason	" 13	120	55-57	Medium..	3½-4½	" ..	36	—	63	Considerably.
49	Lakefield	" 14	121	58-60	Stiff	4-4½	" ..	36	—	60	Slightly.
50	Beaudry	" 11	118	52-54	Medium..	3-3½	Bearded. .	35	20	62	"
51	Fraser	" 1	108	48-50	Stiff	2½-3½	" ..	35	20	61	"
52	Norval	" 7	114	55-57	"	3-3½	" ..	35	20	62	Badly.
53	Morley	" 15	122	58-60	"	3½-4½	Beardless. .	35	20	62	Slightly.
54	Harper	" 15	12	55-57	"	3½-4½	" ..	35	20	60	"
55	Wellman's Fife	" 15	122	52-54	"	4½-5½	" ..	34	40	61½	"
56	Harold	" 3	110	48-50	Weak	2½-3½	Bearded. .	34	40	61½	Considerably.
57	Blair	" 8	115	44-46	Stiff	2½-3	Beardless. .	34	40	62	Slightly.
58	Red Swedish	" 12	119	57-59	"	4½-5½	Bearded. .	34	—	62½	"
59	Gelun	" 6	113	47-49	Weak	2½-3	" ..	34	—	59	"
60	Captor	" 11	118	55-57	Stiff	3½-4	Beardless. .	34	—	60½	"
61	Robson	" 13	120	57-59	"	5½-6½	" ..	34	—	59	"
62	Orleans	" 15	122	58-60	"	4½-5½	" ..	34	—	61½	"
63	Markham	" 16	123	57-59	"	4½-5½	" ..	34	—	60½	Considerably.
64	Ladoga	" 11	118	55-57	"	3½-4½	Bearded. .	33	20	61	"
65	Beauty	" 15	122	57-59	"	4½-5½	Beardless. .	33	20	59½	Slightly.
66	Florence	" 14	121	54-56	"	3-3½	" ..	33	20	61	Considerably.
67	Felbrig Australian No. 7	" 16	123	55-57	"	4½-5½	" ..	33	20	59	Slightly.
68	Australian H.	" 19	120	52-54	Medium..	4½-5	" ..	33	20	60½	Considerably.
69	Emporium	" 16	123	57-59	Stiff ...	5-5½	Bearded. .	32	40	62	Slightly.
70	Alpha	" 16	123	54-56	"	4½-5	Beardless. .	32	40	61	"
71	Weldon	" 15	122	59-61	Medium..	4½-5½	" ..	32	4	60	"
72	Tracey	" 18	119	54-56	Stiff	4½-5	" ..	32	40	61	"
73	Boyle	" 15	122	60-62	"	4-4½	" ..	32	40	61	"
74	Australian No 33 ...	" 15	122	57-59	"	3½-4	" ..	32	—	60	"
75	Oxbow	" 16	117	46-48	"	3½-4½	" ..	32	—	60	"
76	Chester	" 14	121	50-52	"	3½-4½	" ..	31	20	63½	"
77	Stanley	" 14	121	56-58	"	4½-5½	" ..	30	40	62	"
78	Dayton	" 8	115	56-58	Weak ...	2½-3½	Bearded. .	30	40	59	Considerably.
79	Newdale	" 16	123	53-55	Stiff	3½-4½	Beardless. .	30	40	62½	"
80	Australian No. 1 ...	" 14	115	50-52	"	4-4½	" ..	30	40	60½	Slightly.
81	Australian No. 12 ...	" 18	119	50-52	Medium..	4½-5	" ..	30	40	60½	"
82	Australian No. 28 ...	" 15	116	51-53	Stiff	4-4½	" ..	30	40	61	"

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SPRING WHEAT—TEST OF VARIETIES—*Concluded.*

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
				Inches.		Inches.		Bush.	Lbs.		
83	Australian No. 9....	Aug. 16	123	52—54	Stiff....	4 $\frac{1}{2}$ —5	Bearded..	39	40	60 $\frac{1}{2}$	Considerably.
84	Cartier	" 15	122	49—51	"	3 $\frac{1}{2}$ —4 $\frac{1}{2}$	" ..	30	—	62 $\frac{1}{2}$	Slightly.
85	Speltz.....	" 14	121	48—50	"	2 $\frac{1}{2}$ —3	" ..	30	—	58	"
86	Early Riga.....	" 7	114	50—52	" ..	2 $\frac{1}{2}$ —3	Beardless.	29	20	60	Considerably.
87	Australian No. 15...	" 16	117	45—47	"	3 $\frac{1}{2}$ —4 $\frac{1}{2}$	" ..	29	20	60	"
88	Australian No. 27...	" 16	123	56—58	"	4 $\frac{1}{2}$ —5 $\frac{1}{2}$	" ..	29	20	60	Slightly.
89	Angus.....	" 13	120	55—57	Medium..	4—4 $\frac{3}{4}$	" ..	28	40	63	"
90	Australian No. 25...	" 16	123	53—55	Stiff	4 $\frac{1}{2}$ —5 $\frac{1}{2}$	" ..	28	40	60	"
91	Steinmedal fr. Victoria, Aust.....	" 16	117	46—48	"	3 $\frac{1}{2}$ —4 $\frac{1}{2}$	" ..	28	40	59	Badly.
92	Dufferin.....	" 13	120	53—55	Medium ..	3 $\frac{1}{2}$ —4 $\frac{1}{2}$	Bearded..	28	—	61 $\frac{1}{2}$	Considerably.
93	Australian No. 18...	" 16	117	47—49	Stiff.....	4—4 $\frac{3}{4}$	Beardless.	28	—	60 $\frac{1}{2}$	Slightly.
94	Australian No. 10...	" 16	123	47—49	"	4—4 $\frac{3}{4}$	" ..	27	20	62	"
95	Goose	" 15	122	53—55	"	2 $\frac{3}{4}$ —3 $\frac{1}{4}$	Bearded..	26	—	62 $\frac{1}{2}$	"
96	Spence.....	" 11	112	50—52	"	2 $\frac{3}{4}$ —3 $\frac{1}{4}$	" ..	24	40	62 $\frac{1}{2}$	"
97	Cassel.....	" 15	122	57—59	"	4 $\frac{1}{2}$ —5	Beardless.	24	—	61	"
98	Washington No. 2959	" 16	117	44—46	Medium..	3—3 $\frac{1}{2}$	Bearded..	24	—	29 $\frac{1}{2}$	"
99	Washington No. 5643	" 16	117	50—52	Medium..	3 $\frac{3}{4}$ —4 $\frac{1}{4}$	" ..	23	20	60 $\frac{3}{4}$	"
100	Washington No. 5646	" 17	118	43—45	" ..	2 $\frac{3}{4}$ —3	" ..	22	40	63	"
101	Grant	" 16	117	48—50	Weak	4—4 $\frac{3}{4}$	" ..	22	—	60	"
102	Washington No. 5645	" 20	121	48—50	Stiff.	2 $\frac{3}{4}$ —3 $\frac{1}{4}$	" ..	22	—	60	Considerably.
103	Australian No. 21...	" 11	112	42—44	"	3—3 $\frac{1}{2}$	Beardless.	20	40	53 $\frac{1}{2}$	"
104	Australian No. 14...	" 12	113	46—48	"	3 $\frac{1}{2}$ —4	" ..	19	20	58	Badly.
105	Washington No. 5642	" 16	117	53—55	Medium..	2 $\frac{1}{2}$ —3	Bearded..	19	20	60	"
106	Washington No. 5644	" 16	117	50—52	Stiff.....	2 $\frac{3}{4}$ —3 $\frac{1}{4}$	" ..	19	20	58	Considerably.
107	Australian No. 11...	" 16	117	48—50	"	4—4 $\frac{1}{2}$	Beardless.	18	—	58	"
108	Leutewitzer Sand...	" 9	110	40—42	"	3—3 $\frac{3}{4}$	Bearded..	18	—	54	Badly.
109	Strabes.....	" 16	117	49—51	"	4—4 $\frac{3}{4}$	" ..	17	20	60	Considerably.
110	Perron (Les Eboulements)	" 11	112	44—46	"	3—3 $\frac{1}{2}$	Beardless.	16	40	57	Badly.
111	Powell.....	" 12	113	43—45	"	3—3 $\frac{1}{2}$	" ..	14	40	57 $\frac{1}{2}$	Slightly.
112	Washington No. 5639	" 19	120	41—43	Weak	3—3 $\frac{1}{2}$	Bearded..	14	40	58	"
113	Washington No. 5800	" 16	117	49—51	Medium..	2 $\frac{1}{2}$ —3 $\frac{1}{4}$	" ..	14	40	56	Badly.
114	Kingsford	" 12	113	46—48	Stiff.....	3—3 $\frac{3}{4}$	Beardless.	13	20	57	"
115	Redpath.	" 17	118	45—47	"	4 $\frac{1}{4}$ —4 $\frac{3}{4}$	" ..	12	40	59	Slightly.
116	Australian No. 2...	" 16	117	48—50	Weak	3 $\frac{3}{4}$ —4 $\frac{1}{2}$	" ..	10	40	54	Considerably.
117	Washington No. 5799	" 16	117	44—46	Medium..	5 $\frac{1}{2}$ —6 $\frac{1}{4}$	Bearded..	10	40	54	Badly,
118	Polonian.....	" 18	119	40—42	Stiff.....	6—6 $\frac{3}{4}$	" ..	8	40	52 $\frac{1}{2}$	"

EXPERIMENTS WITH FALL WHEAT.

Twenty varieties of fall wheat were under trial last season. They were sown on September 6, 1901, on a sandy loam of good quality in plots of one-fortieth of an acre each. The grain was sown at the rate of 1 $\frac{3}{4}$ bushels per acre.

All the varieties wintered well, made a strong and even growth and produced good crops.

FALL WHEAT—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Rusted.	
								Bush.	Lbs.			
				Inches.		Inches.		Bush.	Lbs.	Lbs.		
1	Dawson's Golden Chaff	July	25	322	55—57	Stiff.....	3½—4	Beardless..	53	20	60	Considerably.
2	Imperial Amber . . .	"	26	323	58—60	Medium..	3 —3½	Bearded..	46	..	62½	Slightly.
3	Egyptian Amber.....	"	28	325	53—55	Stiff.....	2¾—3¼	" ..	45	20	61½	"
4	Surprise.....	"	28	325	57—59	" ..	3 —3	Beardless..	44	..	60	"
5	Jones' Winter Fife...	"	27	324	49—51	" ..	3 —3	" ..	42	40	61	Considerably.
6	Reliable.....	"	27	324	48—50	" ..	3¼—3	Bearded..	41	20	62	Slightly.
7	Red Velvet Chaff....	"	27	324	57—59	" ..	3¼—3	Beardless..	41	20	61½	"
8	Gold Coin.....	"	26	323	50—52	" ..	2½—3¼	" ..	40	40	61	Considerably.
9	Poole.....	"	28	325	49—51	" ..	3½—4	" ..	40	..	60½	Slightly.
10	Velvet Chaff.....	"	25	322	53—55	" ..	2¼—3	Bearded..	40	..	62½	"
11	Buda Pesth.....	"	26	323	50—52	Medium..	2¾—3¼	" ..	40	..	61½	Considerably.
12	Golden Cross	"	29	326	43—45	Stiff.....	2 —2½	" ..	39	20	62	Badly.
13	Treadwell	"	29	326	50—52	" ..	2½—3	" ..	36	..	61½	Slightly.
14	Early Red Clawson ..	"	28	325	49—51	" ..	3¼—3¾	Beardless..	36	..	60	"
15	Long Berry Red.....	"	26	323	50—52	Weak ...	2½—3¼	Bearded..	36	..	61½	Badly.
16	Tasmania Red	"	26	323	49—51	Medium..	2¼—2¾	" ..	35	20	62	Considerably.
17	Turkey Red	"	27	324	45—47	" ..	3 —3½	" ..	34	40	62½	Slightly.
18	Pride of Illinois	"	26	323	49—51	Stiff.....	3¼—3¾	Beardless..	34	..	61½	Badly
19	Bonnell.....	"	28	325	58—60	" ..	3¼—3¾	" ..	33	20	61	Slightly.
20	American Bronze	"	28	325	48—50	" ..	3¼—4	" ..	28	40	61	Considerably.

GRAIN SOWN IN DIFFERENT QUANTITIES PER ACRE ON SANDY AND CLAY LOAM.

These experiments were all conducted on plots of one-fortieth acre each on both sandy loam and clay loam. It will be noticed that the crops are heaviest on the clay loam in every instance while those on the sandy loam are very variable probably owing to unevenness in the quality of the land.

WHEAT SOWN IN DIFFERENT QUANTITIES PER ACRE ON SANDY LOAM SOIL.
(Sown in 1902, May 3; ripe, August 18.)

Name of Variety.	1901.			1902.		
	No. of Days Maturing.	Yield per Acre.		No. of Days Maturing.	Yield per Acre.	
		Bush.	Lbs.		Bush.	Lbs.
Preston 1 bush. per acre.....	100	10	20	108	24	—
" 1¼ "	100	15	—	108	20	40
" 1½ "	100	19	40	108	15	20
" 2 "	100	20	20	108	10	40
" 2½ "	100	21	—	108	20	40
" 3 "	100	19	40	108	17	20

WHEAT SOWN IN DIFFERENT QUANTITIES PER ACRE ON CLAY LOAM SOIL.
(Sown in 1902, April 24; ripe, August 10.)

Preston 1 bush. per acre.	97	28	20	108	24	40
" 1¼ "	97	28	20	108	24	40
" 1½ "	97	29	—	108	29	20
" 2 "	97	26	20	108	28	—
" 2½ "	97	26	20	108	30	—
" 3 "	97	25	—	108	24	40

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OATS SOWN IN DIFFERENT QUANTITIES PER ACRE ON SANDY LOAM SOIL.

(Sown in 1902, May 3; ripe, August 17.)

Name of Variety.	1901.			1902.		
	No. of Days Maturing.	Yield per Acre.		No. of Days Maturing.	Yield per Acre.	
		Bush.	Lbs.		Bush.	Lbs.
Banner $1\frac{1}{2}$ bush. per acre.....	96	41	6	107	60	—
" 2 "	96	59	14	107	45	30
" $2\frac{1}{2}$ "	96	57	2	107	52	32
" 3 "	96	43	18	107	50	20
" $3\frac{1}{2}$ "	96	31	26	107	50	20
" 4 "	96	35	10	107	54	4

OATS SOWN IN DIFFERENT QUANTITIES PER ACRE ON CLAY LOAM SOIL.

(Sown in 1902, April 24; ripe, August 13.)

Banner $1\frac{1}{2}$ bush. per acre.....	92	58	28	111	63	18
" 2 "	92	65	30	111	62	12
" $2\frac{1}{2}$ "	92	67	2	111	72	32
" 3 "	92	64	24	111	67	2
" $3\frac{1}{2}$ "	92	61	6	111	70	20
" 4 "	92	57	22	111	67	2

BARLEY SOWN IN DIFFERENT QUANTITIES PER ACRE ON SANDY LOAM SOIL.

(Sown in 1902, May 3; ripe, August 5.)

Mensury $1\frac{1}{2}$ bush. per acre.....	84	35	35	95	40	40
" 2 "	84	37	19	95	28	16
" $2\frac{1}{2}$ "	84	43	11	95	27	24
" 3 "	84	42	19	95	37	24
" $3\frac{1}{2}$ "	84	39	23	95	26	32
" 4 "	84	43	11	95	45	—

BARLEY SOWN IN DIFFERENT QUANTITIES PER ACRE ON CLAY LOAM SOIL.

(Sown in 1902, April 24; ripe, August 1.)

Mensury $1\frac{1}{2}$ bush. per acre.....	83	37	—	99	64	8
" 2 "	83	40	35	99	70	40
" $2\frac{1}{2}$ "	83	44	3	99	68	16
" 3 "	83	45	35	99	69	8
" $3\frac{1}{2}$ "	83	45	35	99	65	—
" 4 "	83	44	3	99	62	24

EXPERIMENTS WITH PEASE.

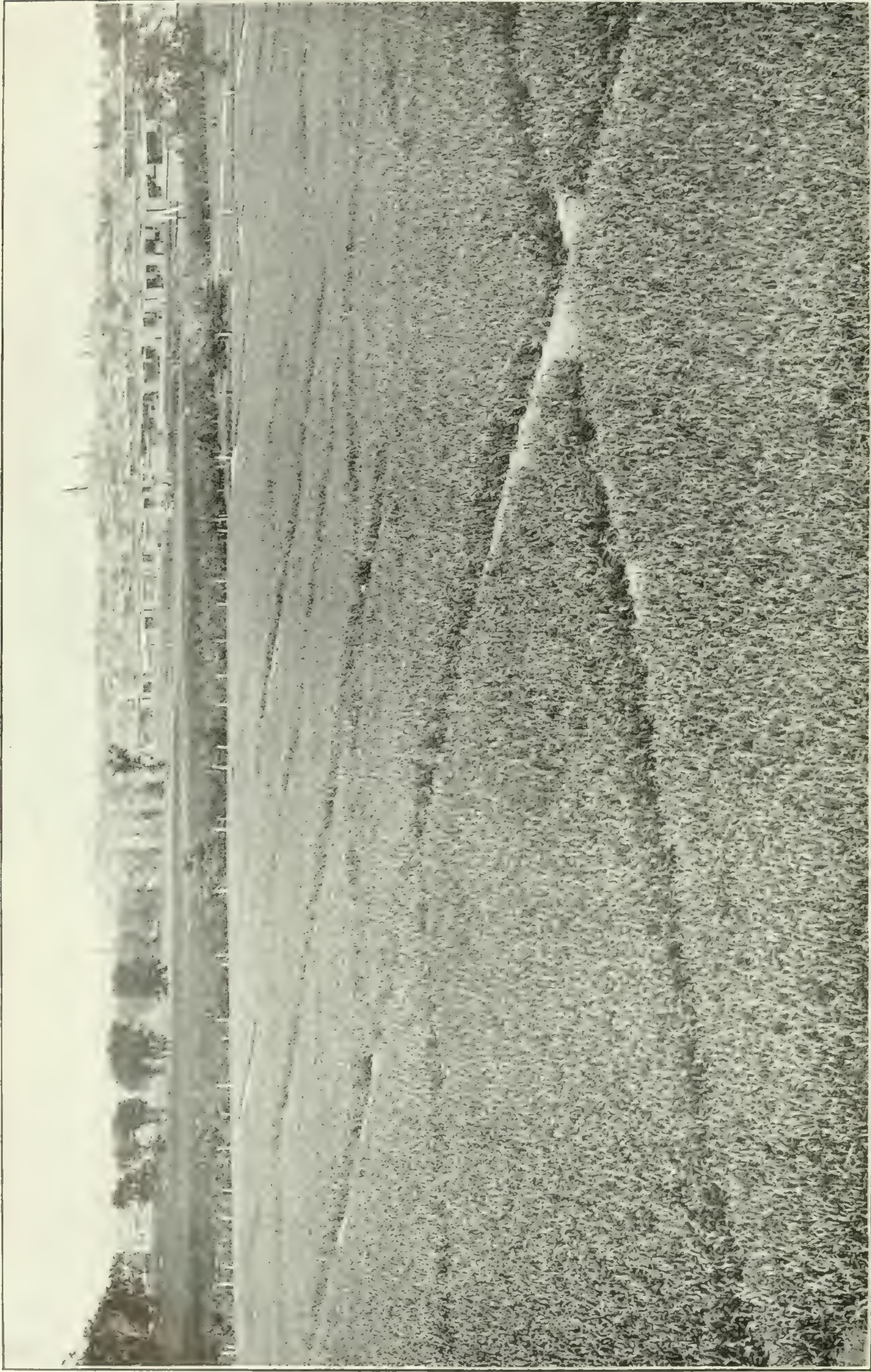
Sixty-one varieties were included in the uniform trial plots during the season of 1902. The soil on which they were sown was a mixed clay and sandy loam, in some parts the clay predominated, in others it was more sandy. The previous crop was experimental plots of wheat. The land received a dressing of fresh barn-yard manure of about twelve tons per acre during the winter of 1899-1900, which was put on the frozen ground in small heaps of about one-third of a cart load each, and spread and ploughed under in the spring. No manure has been applied since. In the autumn of 1901 after the wheat was harvested the land was ploughed shallow to start shed grain and weed seeds, and ploughed again later about seven inches deep and left in that condition until the following spring, when it was cultivated twice with the two-horse cultivator and harrowed twice with the smoothing harrow before the pease were sown.

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The size of the plots was one-fortieth of an acre each and the pease were sown on April 23 at the rate of two to three bushels per acre, depending on the size of the pea.

PEASE—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.	No. of days Maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Yield per Acre.		Weight per Bushel.
					Inches.	Inches.	Bush.	Lbs.	Lbs.
1	Cooper.....	Aug. 21..	120	Medium....	65-70	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	48	40	63
2	Mackay.....	" 22..	121	Strong.....	70-75	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	46	40	62
3	Pride.....	" 23..	122	Medium....	45-50	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	46	..	61
4	Nelson.....	" 18..	117	"	45-50	2-2 $\frac{1}{2}$	46	..	63
5	Pearl.....	" 21..	120	Strong.....	70-75	2-2 $\frac{1}{2}$	45	20	61
6	Paragon.....	" 19..	118	Medium....	30-35	2-2 $\frac{3}{4}$	45	20	63
7	Arthur.....	" 18..	117	Strong.....	55-60	2-2 $\frac{1}{2}$	44	40	63
8	Fenton.....	" 23..	122	"	60-65	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	44	40	62
9	Harrison's Glory.....	" 23..	122	"	70-75	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	44	40	63
10	Crown.....	" 22..	121	"	60-65	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	43	20	63
11	Canadian Beauty.....	" 22..	121	"	65-70	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	43	20	62 $\frac{1}{2}$
12	Field Gray.....	" 18..	117	Medium....	60-65	1 $\frac{3}{4}$ -2	42	40	62 $\frac{1}{2}$
13	Prince Albert.....	" 23..	122	Strong.....	75-80	2 $\frac{1}{4}$ -3	42	40	61 $\frac{1}{2}$
14	Alma.....	" 22..	121	"	55-60	2 $\frac{1}{4}$ -3	42	..	61
15	Kent.....	" 22..	121	"	55-60	2 $\frac{1}{4}$ -3	42	..	61 $\frac{1}{2}$
16	Prince.....	" 24..	123	"	70-75	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	42	..	62
17	Early Britain.....	" 23..	122	"	45-50	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	41	20	61 $\frac{1}{2}$
18	Daniel O'Rourke.....	" 23..	122	"	70-75	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	40	40	63 $\frac{1}{2}$
19	Golden Vine.....	" 21..	120	"	60-65	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	40	..	63
20	White Wonder.....	" 20..	119	Medium....	30-35	2-2 $\frac{3}{4}$	39	20	63
21	English Gray.....	" 24..	123	Strong.....	60-65	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	38	40	62 $\frac{1}{2}$
22	Prussian Blue.....	" 21..	120	"	70-75	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	38	..	63
23	Black Eyed Marrowfat.....	" 26..	125	"	70-75	2 $\frac{3}{4}$ -3 $\frac{1}{4}$	37	20	62
24	Multiplier.....	" 29..	128	"	70-75	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	37	20	63 $\frac{1}{2}$
25	Chancellor..	" 18..	117	"	70-75	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	37	20	62 $\frac{3}{4}$
26	King.....	" 23..	122	Medium....	45-50	2-2 $\frac{1}{2}$	37	20	63 $\frac{1}{2}$
27	Duke.....	" 22..	121	Strong.....	60-65	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	37	20	62 $\frac{1}{2}$
28	Carleton.....	" 25..	124	"	75-80	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	36	..	62
29	Elliot.....	" 26..	125	"	75-80	2-2 $\frac{3}{4}$	35	20	61 $\frac{3}{4}$
30	New Potter.....	" 27..	126	"	55-60	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	35	20	62
31	Trilby.....	" 23..	122	"	70-75	2-2 $\frac{1}{2}$	34	40	62 $\frac{1}{2}$
32	Creeper.....	" 21..	120	"	60-65	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	34	40	63
33	Agnes.....	" 21..	120	"	70-75	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	34	40	63 $\frac{3}{4}$
34	Vincent.....	" 24..	123	Medium....	60-65	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	34	..	62 $\frac{1}{2}$
35	Fergus.....	" 30..	129	"	65-70	2-2 $\frac{1}{2}$	34	..	63
36	Dover.....	" 27..	126	Strong.....	70-75	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	34	..	62 $\frac{1}{2}$
37	Macoun.....	" 27..	126	"	75-80	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	34	..	63
38	Wisconsin Blue.....	" 23..	122	"	70-75	2-2 $\frac{1}{4}$	34	..	63 $\frac{1}{2}$
39	Archer.....	" 25..	124	"	70-75	2-2 $\frac{1}{2}$	33	20	62
40	Elephant Blue.....	" 23..	122	Medium....	55-60	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	32	40	62 $\frac{1}{2}$
41	Bruce.....	" 22..	121	Strong.....	60-65	2 $\frac{1}{4}$ -3	32	..	62 $\frac{1}{2}$
42	Oddfellow.....	" 19..	118	Medium....	48-54	2-2 $\frac{1}{2}$	32	..	65
43	Large White Marrowfat.....	" 23..	122	Strong.....	65-70	2 $\frac{3}{4}$ -3 $\frac{1}{4}$	31	20	63
44	Gray (Pisum Arvense, No. 13 from Norway).....	" 20..	119	"	65-70	1 $\frac{3}{4}$ -2	31	20	64
45	Gregory.....	" 26..	125	"	75-80	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	31	20	62
46	Maple.....	" 29..	128	"	70-75	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	31	20	63
47	Victoria.....	" 28..	127	"	75-80	2-2 $\frac{1}{2}$	30	40	62 $\frac{1}{2}$
48	Centennial.....	" 27..	126	"	70-75	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	30	40	61 $\frac{1}{2}$
49	Mummy.....	" 24..	123	"	55-60	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	30	40	63
50	French Canner.....	" 20..	119	Medium....	50-55	1 $\frac{3}{4}$ -2 $\frac{1}{2}$	30	..	62 $\frac{1}{2}$
51	Perth.....	" 23..	122	Strong.....	60-65	2 $\frac{1}{4}$ -3	30	..	62 $\frac{1}{2}$
52	Bright.....	" 25..	124	"	75-80	2 $\frac{1}{4}$ -2 $\frac{3}{4}$	29	20	63 $\frac{1}{2}$
53	Bedford.....	" 27..	126	"	70-75	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	29	20	63
54	Picton.....	" 22..	121	"	50-55	2-2 $\frac{3}{4}$	29	20	63 $\frac{1}{2}$
55	Lanark.....	" 28..	127	"	75-80	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	28	40	63 $\frac{1}{2}$
56	German White.....	" 22..	121	Medium....	55-60	2-2 $\frac{1}{2}$	28	40	63
57	Elder.....	" 29..	128	Strong.....	80-85	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	27	20	63
58	Herald.....	" 29..	128	"	75-80	2-2 $\frac{1}{2}$	26	40	62 $\frac{1}{2}$
59	Chelsea.....	" 26..	125	"	70-75	1 $\frac{3}{4}$ -2 $\frac{1}{4}$	26	..	63
60	Grass Pea.....	Sept. 4..	133	"	60-65	1-1 $\frac{1}{2}$	23	20	59
61	Marrowfat (fr. Norway)....	Aug. 15..	114	"	40-45	2 $\frac{3}{4}$ -3 $\frac{1}{4}$	20	40	60



EXPERIMENTAL PLOTS OF GRAIN, PHOTOGRAPHED BEFORE HEADING, CENTRAL FARM, OTTAWA.

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EXPERIMENTS WITH INDIAN CORN.

Thirty-eight varieties of Indian corn were tested during the season of 1902, side by side on fairly uniform land. The soil was a sandy loam of good quality, which received a dressing of barn-yard manure about 12 tons to the acre, during the winter of 1901-2. This was placed on the frozen land, fresh from the barn yard in small heaps of about one third of a cart load each and spread and ploughed under in the spring. The previous crop was experimental plots of oats and wheat. The land was gang-ploughed shallow shortly after harvest to start shed grain and weed seeds and ploughed again late in the autumn about seven inches deep. In the spring of 1902 after the manure was ploughed under the land was harrowed twice with the smoothing harrow before sowing. The corn was sown with the seed drill in rows thirty-five inches apart, also in hills thirty-five inches apart each way. When the plants were from five to seven inches high they were thinned so as to leave them from six to eight inches apart in the rows, and from four to five plants in each hill. The varieties were all sown May 27 and were cut for ensilage September 24. The yield per acre has been calculated from the weight of the crop cut from two rows each 66 feet long.

INDIAN CORN—TEST OF VARIETIES.

Number.	Name of Variety.	Character of Growth.	Height.	Leafiness.	Condition when Cut.	Weight per Acre grown in Rows.		Weight per Acre grown in Hills.	
			Inches.			Tons.	Lbs.	Tons.	Lbs.
1	Eureka.....	Very strong	125—130	Leafy	Early milk..	32	460	22	..
2	North Dakota Yellow.....	"	95—100	" ..	" ..	31	1,800	31	920
3	Salzer's All Gold	"	95—100	" ..	" ..	30	60	27	1,440
4	King Philip.....	Strong.....	90— 95	Medium..	" ..	28	320	25	1,040
5	Early Butler	" ..	95—105	Leafy	Late milk...	26	1,020	23	420
6	Thoro'bred White Flint.....	Very strong	105—110	Very leafy	Early milk..	26	360	32	240
7	Mamm. Eight-rowed Flint.....	Strong.....	100—105	Leafy	" ..	26	140	22	440
8	Amber Rice.....	Medium....	85— 90	" ..	Doughy	26	140	22	1,540
9	Country Gentleman.....	" ..	80— 90	Very leafy	" ..	25	1,700	20	920
10	Superior Fodder.....	Strong.....	85— 90	" ..	Early milk..	25	300	16	560
11	White Cap Yellow Dent.....	Very strong.	100—105	Leafy	" ..	24	1,500	20	700
12	Sanford.....	Strong.....	80— 85	Very leafy	Late milk...	24	1,280	27	1,440
13	North Dakota White	Very strong.	100—105	Leafy	Early milk..	24	840	23	200
14	Compton's Early.....	Strong.....	95—105	Very leafy	Late milk...	24	400	23	1,520
15	Giant Prolific Ensilage.....	Very strong.	90—100	Leafy	Early milk..	24	400	17	1,860
16	Pearce's Prolific	Strong.....	90— 95	Medium..	Doughy	24	400	28	1,640
17	Pride of the North.....	" ..	90— 95	Leafy	" ..	23	1,520	23	1,520
18	Selected Leaming.....	Very strong.	100—105	" ..	Late milk...	23	1,300	17	980
19	White Pearl Pop	Strong.....	100—105	Medium..	Early milk..	22	1,320	25	1,260
20	Mammoth Cuban.....	Very strong.	100—105	Leafy	Late milk...	22	1,320	17	1,640
21	Red Cob Ensilage.....	"	100—105	Medium..	" ..	22	1,100	24	1,280
22	Early Golden Surprise.....	"	115—120	Leafy	" ..	22	..	21	1,340
23	King of the Earliest.....	Strong.....	85— 95	" ..	" ..	20	920	18	300
24	Champion White Pearl	" ..	90—100	" ..	" ..	20	700	20	920
25	Longfellow.....	" ..	85— 90	" ..	Doughy	20	700	20	260
26	Angel of Midnight.....	" ..	90—100	" ..	Late milk...	20	..	22	1,100
27	Black Mexican.....	Medium....	75— 80	" ..	Early milk..	20	..	18	520
28	Yellow Six Weeks.....	" ..	60— 65	" ..	Late milk...	19	1,160	12	1,740
29	Evergreen Sugar.....	" ..	80— 90	Very leafy	Early milk..	18	1,840	14	160
30	Early Yellow Long Eared.....	" ..	80— 90	Leafy	Doughy	18	1,620	23	1,960
31	Cloud's Early Yellow.....	Very strong.	105—115	Very leafy	Late milk..	18	960	18	1,400
32	Canada White Flint	Strong.....	95—105	Leafy	" ..	17	760	18	1,400
33	Early Mastodon	" ..	90—100	" ..	Early milk..	17	760	14	1,920
34	Mitchell's Early.....	Medium....	65— 70	" ..	Doughy	17	760	12	1,960
35	Salzer's Earliest Ripe.....	" ..	60— 65	Medium..	" ..	17	100	11	1,100
36	Extra Early Huron.....	Strong.....	85— 95	Leafy	" ..	16	1,220	12	1,960
37	Kendall's Early Giant.....	Medium....	65— 75	" ..	Late milk...	14	1,920	11	880
38	Early August.....	Short & weak	25— 30	" ..	Ripe.....	3	1,920	1	1,740

INDIAN CORN PLANTED AT DIFFERENT DISTANCES.

Three varieties were chosen for this test, the Champion White Pearl, Selected Leaming and Longfellow. They were sown in rows at different distances apart. The soil was alongside of that used for the test of varieties, and its treatment and preparation were the same. The corn was sown with the seed drill on May 27, and was cut for ensilage September 24. Four rows were sown in each case, and the yield per acre has been calculated from the weight of crop obtained from the two inside rows, each 66 feet long.

Name of Variety.	Width of Row.	Character of Growth.	Height when Cut.	Condition when Cut.	Weight per Acre.	
	In.		In.		Tons.	Lbs.
Champion White Pearl.....	21	Strong.. ...	95—100	Late milk...	22	472
" "	28	"	95—100	" ...	25	1,183
" "	35	Very strong.	98—102	" ...	29	1,770
" "	42	" ..	98—102	" ...	25	341
Selected Leaming.....	21	Strong.....	105—110	" ...	22	181
"	28	"	105—110	" ...	22	820
"	35	Very strong.	108—114	" ...	20	752
"	42	" ..	108—114	" ...	21	1,393
Longfellow	21	Strong.....	90— 95	" ...	23	507
"	28	"	90— 95	" ...	24	970
"	35	Very strong.	95—100	" ...	23	638
"	42	" ..	95—100	" ...	19	676

EXPERIMENTS WITH TURNIPS.

Thirty varieties of turnips were under test in 1902, all sown side by side on similar land. This land was adjoining that on which the Indian corn was sown ; it was similar in character, and its treatment and preparation were the same. Before sowing, the land was made up in drills two feet apart and rolled with a heavy land roller, which flattened the drills nearly one-half, leaving a firm seed bed. The seed was sown at the rate of three pounds per acre. Two sowings were made of each sort, the first on May 12, the second on May 26. They were also pulled on two different dates, the first on October 14, the 2nd on October 28. The yield per acre has been calculated in each case from the weight of roots gathered from one row 66 feet in length.

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Number.	Name of Variety.	Yield per Acre from 1st Sowing.		Yield per Acre from 2nd Sowing.		Yield per Acre from 1st Sowing.		Yield per Acre from 2nd Sowing.	
		1st Pulling Oct. 14.		1st Pulling Oct. 14.		2nd Pulling Oct. 28.		2nd Pulling Oct. 28.	
		Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1	East Lothian.....	53	1,910	34	1,960	48	30	39	1,530
2	Good Luck.....	52	280	29	740	55	550	34	1,300
3	Halewood's Bronze Top.....	49	670	30	1,710	46	1,390	25	1,480
4	Jumbo.....	48	360	22	880	53	260	28	160
5	Hall's Westbury ..	46	1,720	28	1,420	47	1,700	24	1,170
6	Imperial Swede.....	46	1,720	28	1,090	46	730	26	1,790
7	Emperor Swede	46	1,390	36	1,260	43	1,780	27	1,770
8	Magnum Bonum.....	46	730	33	660	51	1,620	33	30
9	Giant King	46	400	30	60	45	750	26	140
10	Elephant's Master	45	1,740	25	490	45	90	19	1,930
11	New Century.....	45	750	21	1,560	56	1,190	26	1,130
12	Bangholm Selected.....	44	1,430	33	660	43	790	30	1,050
13	Mammoth Clyde	44	770	26	470	46	1,060	23	530
14	Prize Winner.....	44	770	29	1,400	51	960	29	1,400
15	Champion Purple Top.....	44	110	31	1,690	44	770	24	1,830
16	Shamrock Purple Top.....	44	110	29	1,730	52	610	33	660
17	Drummond Purple Top.....	43	1,120	27	1,110	54	1,890	27	1,110
18	Perfection Swede.....	43	790	25	820	53	260	37	1,900
19	Prize Purple Top	42	810	26	1,130	51	1,950	34	640
20	Kangaroo.....	42	480	28	100	56	860	31	40
21	Skirvings.....	39	1,860	19	910	49	340	25	490
22	Selected Purple Top	39	1,530	29	80	51	600	33	
23	Marquis of Lorne	39	1,200	24	1,830	45	1,740	27	480
24	Monarch	38	1,880	25	1,150	51	300	26	1,130
25	Carter's Elephant.....	37	910	21	1,230	35	1,610	24	180
26	New Arctic.....	36	930	27	1,440	45	1,740	33	1,650
27	West Norfolk Red Top.....	35	1,610	19	610	37	1,240	23	200
28	Selected Champion.....	28	1,420	24	1,170	36	1,590	20	1,910
29	Sutton's Champion.....	22	1,540	21	1,890	33	1,320	31	1,020
30	Webb's New Renown.....	20	1,580	20	260	29	1,730	20	920

	Tons.	Lbs.
The average from the 1st sowing 1st pulling was.....	42	84
The average from the 2nd sowing 1st pulling was.....	37	318
The average from the 1st sowing 2nd pulling was.....	47	783
The average from the 2nd sowing 2nd pulling was.....	28	794

EXPERIMENTS WITH MANGELS.

Twenty-eight varieties of mangels were under test in 1902. They were all sown side by side adjoining the Indian corn. The land was similar in character and its treatment and preparation were the same. The drills were made up two feet apart and rolled with a heavy land roller to make a firm bed before the seed was sown. Two sowings were made of each sort—the first on May 12, the second on May 26. They were also pulled on two different dates. The first pulling was on October 14, the second on October 28. The yield per acre has been calculated in each case from the weight of roots gathered from one row 66 feet long.

Number.	Name of Variety.	Yield per acre from 1st Sowing 1st Pulling October 14.		Yield per acre from 2nd Sowing 1st Pulling. October 14.		Yield per acre from 1st Sowing 2nd Pulling October 28.		Yield per acre from 2nd Sowing 2nd Pulling October 28.	
		Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1	Mammoth Long Red.....	55	550	35	1,940	46	1,390	32	350
2	Norbiton Giant.	52	280	30	720	46	1,720	34	640
3	Triumph Yellow Globe.....	51	1,950	36	930	45	750	39	540
4	Mammoth Yellow Intermediate.....	51	300	37	1,240	44	110	34	970
5	Lion Yellow Intermediate.....	50	1,970	36	600	48	690	29	1,400
6	Mammoth Oval Shaped.....	49	1,000	32	680	44	1,760	31	1,690
7	Prize Winner Yellow Globe..	47	50	32	20	41	170	34	640
8	Yellow Intermediate.....	46	1,060	35	1,280	44	1,100	30	1,050
9	Leviathan Long Red.....	44	1,760	35	620	55	550	32	20
10	Selected Mammoth Long Red .	44	440	30	1,710	38	1,220	27	780
11	Prize Mammoth Long Red.....	43	1,450	25	1,150	39	540	25	1,150
12	Warden Orange Globe.....	43	1,120	30	390	44	440	38	1,880
13	Canadian Giant.....	42	1,470	30	1,380	37	580	31	40
14	Gate Post.....	41	1,820	31	700	42	150	32	1,010
15	Giant Yellow Globe.....	41	830	27	1,110	42	480	28	1,090
16	Ward's Large Oval Shaped.....	40	850	26	1,130	45	1,080	25	490
17	Selected Yellow Globe ...	39	540	26	1,460	38	560	23	1,190
18	Half Long Sugar White.....	39	210	29	740	44	110	37	580
19	Champion Yellow Globe.	38	1,880	30	1,050	38	1,880	27	1,110
20	Giant Sugar Mangel.....	38	230	31	700	32	680	28	1,420
21	Gate Post Yellow.....	36	270	33	660	32	1,010	31	40
22	Half Long Sugar Rosy.....	35	1,610	25	820	30	60	22	1,540
23	Elvethan.....	34	1,630	23	1,190	27	1,440	26	1,790
24	Yellow Fleshed Tankard...	33	1,930	25	1,810	38	1,880	25	490
25	Giant Yellow Half Long.....	32	1,340	20	590	39	1,840	28	100
26	Giant Yellow Intermediate.....	25	1,150	20	920	41	170	37	580
27	Golden Fleshed Tankard.....	23	200	21	900	41	500	31	1,030
28	Red Fleshed Tankard.....	22	1,540	20	1,580	28	1,750	25	490

	Tons.	Lbs.
The average from the 1st sowing 1st pulling was.....	40	1,982
The average from the 2nd sowing 1st pulling was.....	29	841
The average from the 1st sowing 2nd pulling was.....	40	1,450
The average from the 2nd sowing 2nd pulling was.....	30	932

EXPERIMENTS WITH CARROTS.

Twenty varieties were under trial in 1902. They were all sown side by side adjoining the turnips and mangels. The land was similar in character, and its treatment and preparation were the same. The drills were made up two feet apart and rolled with a heavy land roller to make a firm bed before the seed was sown. Two sowings were made of each sort, the first on May 12, the second on May 26. The roots were pulled on two different dates, the first pulling was on October 14, the second on October 28. The yield per acre has been calculated in each case from the weight of roots gathered from one row 66 feet long.

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Name of Variety.	Yield per acre from 1st Sowing 1st Pulling Oct. 14.		Yield per acre from 2nd Sowing 1st Pulling Oct. 14.		Yield per acre from 1st Sowing 2nd Pulling Oct. 28.		Yield per acre from 2nd Sowing 2nd Pulling Oct. 28.	
	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1. Carter's Orange Giant.	39	1,200	21	900	27	780	20	1,250
2. Mammoth White Intermediate.	35	1,610	28	100	37	1,240	28	1,750
3. Half Long White.	35	620	26	800	34	640	25	820
4. Improved Short White.	33	990	28	760	38	1,220	31	40
5. Iverson's Champion.	33	990	29	1,730	36	1,590	27	1,770
6. Giant White Vosges.	33	330	27	1,770	38	560	29	410
7. Green Top White Orthe.	31	1,360	24	1,500	35	620	29	1,400
8. Half Long Chantenay.	31	1,030	27	780	30	1,380	25	1,810
9. Ontario Champion.	31	1,030	24	1,830	39	1,530	30	1,710
10. New White Intermediate.	30	1,380	26	800	36	270	32	680
11. Long Yellow Stump Rooted.	27	1,440	21	1,890	29	1,070	25	490
12. Guerande or Ox-heart.	26	1,130	26	470	25	1,480	28	1,420
13. White Vosges Large Short.	24	1,830	20	260	27	1,770	22	1,540
14. White Belgian.	24	180	20	920	33	1,650	24	1,830
15. Yellow Intermediate.	24	180	17	980	26	470	18	1,620
16. Long Scarlet Altringham.	23	1,520	15	30	26	800	18	300
17. Early Gem.	22	1,210	22	880	26	1,790	22	1,870
18. Long Orange or Surrey.	17	1,640	14	1,700	17	650	17	980
19. Scarlet Intermediate.	16	1,000	15	690	23	1,190	20	1,580
20. Scarlet Nantes.	14	1,040	11	1,100	18	1,950	15	690

	Tons.	Lbs.
The average from the 1st sowing, 1st pulling was.	32	1,382
The average from the 2nd sowing, 1st pulling was.	25	1,150
The average from the 1st sowing, 2nd pulling was.	29	1,854
The average from the 2nd sowing, 2nd pulling was.	23	489

EXPERIMENTS WITH SUGAR BEETS.

Eight varieties of sugar beets were tested in 1902. These were sown side by side on land adjoining the turnips and mangels. The land was similar in character and its treatment and preparation were the same. The drills were made up two feet apart and rolled with a heavy land roller to make a firm bed before the seed was sown. Two sowings were made of each sort the first on May 12 the second on May 26. They were also pulled on two different dates, the first pulling was on October 14, the second on October 28. The yield per acre has been calculated from the weight of roots gathered from one row 66 feet long.

Number.	Name of Variety.	Yield per Acre from 1st Sowing. — 1st Pulling Oct. 14.		Yield per Acre from 2nd Sowing. — 1st Pulling Oct. 14.		Yield per Acre from 1st Sowing. — 2nd Pulling Oct. 28.		Yield per Acre from 2nd Sowing. — 2nd Pulling Oct. 28.	
		Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1	Royal Giant.	38	1,880	28	1,750	36	1,920	26	140
2	Danish Improved.	37	1,570	30	720	43	460	30	1,380
3	Danish Red Top.	37	1,570	33	....	35	1,610	30	1,710
4	Red Top Sugar.	35	1,940	25	1,150	36	1,260	26	1,790
5	Improved Imperial.	31	700	27	450	23	1,850	21	570
6	Wanzleben.	28	1,420	21	900	21	1,560	20	1,580
7	Vilmorin's Improved.	27	780	20	1,580	24	1,170	17	320
8	French "Very Rich".	23	1,190	17	650	16	1,000	12	420

	Tons.	Lbs.
The average from the 1st sowing, 1st pulling was	27	1,885
The average from the 2nd sowing, 1st pulling was.....	22	1,094
The average from the 1st sowing, 2nd pulling was.....	30	1,133
The average from the 2nd sowing, 2nd pulling was.....	24	1,698

FIELD PLOTS OF POTATOES EACH ABOUT ¼ ACRE.

The following field plots of potatoes were included in the area devoted to experimental purposes. The land on which these potatoes were planted was similar throughout, and the preparation and treatment were the same for all. The soil was a sandy loam. The previous crop was experimental plots of wheat. After the wheat crop was cut the land was gang-ploughed shallow to start into growth any shed grain or weed seeds lying on the surface; later in the autumn it was again ploughed seven to eight inches deep. During the winter of 1901 and 1902 it received a dressing of about 12 tons of fresh barn-yard manure per acre, which was placed during the winter on the frozen ground in small piles of about a third of a cart load each to prevent fermentation. This was spread in the spring, ploughed under about six inches deep, and harrowed with the smoothing harrow, then made into drills two and a half feet apart and six inches deep for planting. The sets were put from 12 to 15 inches apart. They were all planted May 22, and dug October 6.

Number.	Name of Variety.	Yield per Acre.	
		Bush.	Lbs.
1	Sir Walter Raleigh.....	355	50
2	Uncle Sam.....	334	35
3	Honeoye Rose.....	304	3
4	Wonder of the World.....	258	20
5	New Queen.....	256	40
6	American Wonder.....	244	40
7	Early Harvest.....	244	30
8	Vigorosa.....	238	8
9	Canadian Beauty...	236	40
10	Rochester Rose.....	228	40
11	Everett.....	224	11
12	Early White Prize.....	204	12

The following plots of potatoes, of about one-quarter of an acre each, were planted on similar soil to those last mentioned and received a similar dressing of manure; but this land was in oats in 1901 with which clover was sown. Much of this clover was destroyed by a severe frost in the spring, shortly after the young plants started. These plots had the advantage of a very light crop of clover ploughed under in addition to the manure.

Number.	Name of Variety.	Yield per Acre.	
		Bush.	Lbs.
1	Carman No 1	321	2
2	Early Sunrise.....	269	35
3	Bovee	245	20
4	Prize Taker..	240	20
5	Early Andes.....	203	00

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EXPERIMENTS WITH FLAX.

Seed sown on sandy loam on plots of one fortieth of an acre each, to gain information as to the best time for sowing and the quantity of seed required to give the best results.

FIRST SOWING.

Plot 1.—Forty pounds of seed per acre. Sown April 30, came up May 15 and was ripe August 8. Made a strong and even growth; all standing well.

Weight of straw per acre..... 3,440 pounds.

Yield of seed per acre..... 8 bush. 40 lbs.

Plot 2.—Eighty pounds of seed per acre. Sown April 30, came up May 15 and was ripe August 8. Made a strong and even growth; all standing well.

Weight of straw per acre..... 4,720 pounds.

Yield of seed per acre..... 9 bush. 20 lbs.

SECOND SOWING.

Plot 3.—Forty pounds of seed per acre. Sown May 7, came up May 20 and was ripe August 10. Made a strong and even growth; all standing well.

Weight of straw per acre..... 5,520 pounds.

Yield of seed per acre..... 8 bush.

Plot 4.—Eighty pounds of seed per acre. Sown May 7, came up May 20 and was ripe August 10. Made a strong and even growth; all standing well.

Weight of straw per acre..... 5,760 pounds.

Yield of seed per acre..... 6 bush. 40 lbs.

THIRD SOWING.

Plot 5.—Forty pounds of seed per acre. Sown May 14, came up May 28 and was ripe August 15. Made a strong and even growth; all standing well.

Weight of straw per acre..... 5,680 pounds.

Yield of seed per acre..... 8 bush.

Plot 6.—Eighty pounds of seed per acre. Sown May 14, came up May 28 and was ripe August 15. Made a strong growth; but was considerably lodged.

Weight of straw per acre..... 5,920 pounds.

Yield of seed per acre..... 5 bush. 20 lbs.

FOURTH SOWING.

Plot 7.—Forty pounds of seed per acre. Sown May 21, came up May 31 and was ripe August 17. Made a strong growth, but was partly lodged.

Weight of straw per acre..... 5,600 pounds.

Yield of seed per acre..... 8 bush.

Plot 8.—Eighty pounds of seed per acre. Sown May 21, came up May 31 and was ripe August 17. Made a strong growth, but was considerably lodged.

Weight of straw per acre..... 6,440 pounds.

Yield of seed per acre..... 8 bush. 40 lbs.

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EXPERIMENTS WITH SOJA BEANS.

Three plots of one-fortieth acre each were sown in rows at different distances apart, viz.: 21, 28 and 35 inches, to gain information as to the best distance for sowing to secure the heaviest crops. The soil was a light sandy loam, which received a dressing of barn-yard manure during the winter of 1899 and 1900 of about 12 tons per acre. The previous crop was millet. After the millet was cut, the land was ploughed late in the autumn to the depth of about seven or eight inches, and left in that condition until the following spring, when it was cultivated once with a two-horse cultivator and twice with a smoothing harrow. The beans were sown with a seed drill on May 14, and cut on September 24.

Plot 1.—Sown in rows 21 inches apart; growth strong and even, leafy; average height 30 to 35 inches. The pods were well formed, but the beans were soft when the crop was cut. Total yield of green crop 9 tons 80 lbs. per acre. Yield of beans 12 bushels per acre.

Plot 2.—Sown in rows 28 inches apart; growth strong and leafy; average height 30 to 35 inches. Plot all standing, stalks considerably stiffer than in plot No. 1. The pods were well formed, but the beans were soft when cut. Total yield of green crop 10 tons 1,200 lbs. per acre. Yield of beans 14 bushels 40 lbs. per acre.

Plot 3.—Sown in rows 35 inches apart; growth strong and even, leafy; stems hard and woody; average height 35 to 39 inches. The plants were better podded than those in plots 1 or 2, and the beans were harder when cut, but the plant was less valuable for fodder. Total yield of green crop 9 tons 1,840 lbs. per acre. Yield of beans 10 bushels 40 lbs. per acre.

EXPERIMENTS WITH HORSE BEANS.

Three plots of one-fortieth acre each were sown in rows 21, 28 and 35 inches apart to gain information as to the best distance for sowing to secure the heaviest crop. The land was adjoining that used for soja beans, was similar in quality and received the same treatment. The previous crop was millet. The beans were sown with the seed drill. All the plots were sown on May 14, and cut on September 22.

Plot 1.—Sown in rows 21 inches apart; growth strong, well podded; height 48 to 52 inches, crop all standing. The beans were nearly ripe when cut. Total yield 7 tons 800 lbs. per acre. Yield of beans 37 bushels 20 lbs. per acre.

Plot 2.—Sown in rows 28 inches apart; growth very strong and well podded; height 49 to 53 inches, crop all standing, stalks considerably stiffer than in plot No. 1. The beans were nearly ripe when cut. Total yield 8 tons 160 lbs. per acre. Yield of beans 34 bushels 40 lbs. per acre.

Plot 3.—Sown in rows 35 inches apart; growth strong, medium and well podded; height 49 to 53 inches, crop all standing, stalks stiff. The beans nearly ripe when cut. Total yield 7 tons 1,600 lbs. per acre. Yield of beans 30 bushels 40 lbs.

EXPERIMENTS WITH MILLETS.

Nine varieties of millet were sown on plots of one-fortieth acre each in drills seven inches apart. The soil was a light sandy loam. The previous crop was soja beans. The land received a dressing of barn-yard manure during the winter of 1899 and 1900 of about twelve tons per acre. After the beans were cut the land was ploughed to the depth of seven or eight inches, and left in that condition until the following spring, when it was cultivated once with a two-horse cultivator and twice with a smoothing harrow before sowing. The seed was sown with a Planet Junior seed drill, and all the varieties were sown on May 14. These were all cut when the seed was in the doughy state.

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MILLETS—TEST OF VARIETIES.

Number.	Name of Variety.	Date Cut.	Length of Straw.	Character of Growth.	Weight per Acre Green.		Weight per Acre Dry.	
			Inches.		Tons.	Lbs.	Tons.	Lbs.
1	Algerian.	Sept. 4	50—55	Strong.	17	560	8	800
2	Japanese.	" 4	50—53	"	17	240	8	1920
3	Pearl, late or Cat-tail.	" 14	50—53	Medium.	16	320	8	....
4	German or Golden.	" 6	48—51	Strong.	14	800	6	320
5	Italian or Indian.	" 6	49—52	"	13	1360	4	800
6	White Round Extra French.	Aug. 30	63—65	"	12	....	5	1840
7	Moha Hungarian.	" 30	48—50	"	9	1200	5	1520
8	No. 5648 (Dept. Agr., Wash., U.S.A.).	Sept. 4	25—28	Weak	5	1520	2	1440
9	No. 5647 " "	" 4	30—33	Medium.	3	1360	2	....

EXPERIMENTS WITH MIXED ROOTS AND WITH MIXED ROOTS AND VEGETABLES.

This experiment, first tried last year, has been repeated during the past season. Five rows were sown about 100 feet long and two feet apart. The seed was put in about the usual thickness and the plants subsequently thinned. They were sown on May 12. The vegetables were gathered about the middle of September and the roots pulled late in October. It is evident that any farmer may supply his household with an assortment of vegetables with very little labour or expense by the adoption of this simple method.

Mixed Roots and Roots and Vegetables.				Yield per acre.	
				Tons.	Lbs.
Plot 1—Mangels and turnips.				46	730
" 2—Mangels, carrots and turnips.				42	480
" 3—Carrots and turnips.				36	1,260
" 4—Mangels and carrots.				33	1,980
Carrots, turnips, cabbage, tomatoes and parsnips—					
Plot 5—Yield per acre of cabbage.				14	1,535
" " tomatoes.				5	1,880
" " turnips.				5	230
" " carrots.				4	1,405
" " parsnips.					1,650
				31	700

SPECIAL EXPERIMENTS WITH FERTILIZERS.

In the annual report of the Experimental Farms for 1893, details were given on pages 8 to 24 of the results of a series of tests which were carried on during the previous five or six years with the object of gaining information regarding the effects which follow the application of certain fertilizers and combinations of fertilizers on the more important farm crops. The particulars there given covered the results of six years' experience with crops of wheat and Indian corn and five years' experience with crops of oats, barley, turnips and mangels. The results of similar tests conducted for three years with carrots and one year with sugar beets were also given.

These experiments have been continued, and a summary of the results obtained has been given each year, taking the average yield of crops from the beginning adding the results for the current year, and then giving the average yield for the full time. These tests were undertaken on virgin soil, on a piece of land which was cleared for the purpose. For particulars regarding the clearing and preparing of the land for crop in 1887-88 and its subsequent treatment the reader is referred to the earlier issues of this report.

OBJECT IN VIEW IN CONDUCTING THESE EXPERIMENTS.

In establishing and conducting this series of experiments, the object in view has been to gain information as to the effects produced by certain fertilizers and combinations of fertilizers on particular crops. They were never intended to serve as model test plots such as farmers could copy with advantage in their general practice. On the contrary, to gain the information desired, it has been found necessary to use some fertilizers in unusual quantities, and in other instances to more or less exhaust the soil by a succession of crops of the same sort, practices which in ordinary farming would be extravagant or detrimental. From this long conducted series of tests much useful information has been gained, which appeals to the mind with greater force as experience accumulates from year to year.

VALUABLE INFORMATION GAINED.

These trials, have shown that barn-yard manure can be most economically used in the fresh or unrotted condition; that fresh manure is equal, ton for ton, in crop-producing power to rotted manure, which, other experiments have shown, loses during the process of rotting about 60 per cent of its weight. In view of the vast importance of making the best possible use of barn-yard manure, it is difficult to estimate the value of this one item of information.

When these experiments were planned, the opinion was very generally held that untreated mineral phosphate, if very finely ground, was a valuable fertilizer, which gradually gave up its phosphoric acid for the promotion of plant growth. Ten years' experience has shown that mineral phosphate, untreated, is of no value as a fertilizer.

The use of sulphate of iron, which at the time these tests were begun, was highly recommended, as a means of producing increased crops, has also been proven to be almost useless for this purpose.

Common salt, which has long had a reputation with many farmers for its value as a fertilizer for barley, while others disbelieved in its efficacy, has been shown to be a most valuable agent for producing an increased crop of that grain, while it is of much less use when applied to crops of spring wheat or oats. Land plaster or gypsum has also proven to be of some value as a fertilizer for barley, while of very little service for wheat or oats. Some light has also been thrown on the relative usefulness of single and combined fertilizers.

CHANGES MADE IN THE EXPERIMENTS.

After ten years' experience had demonstrated that finely-ground, untreated mineral phosphate was of no value as a fertilizer, its use was discontinued in 1898. Prior to this it had been used in each set of plots in Nos. 4, 5, 6, 7 and in No. 8 also, in all the different series of plots, excepting roots. In 1898 and 1899, similar weights of the Thomas' phosphate were used in place of the mineral phosphate, excepting in plot 6 in each series. In this plot the Thomas' phosphate was used in 1898 only.

After constant cropping for ten or eleven years, it was found that the soil on those plots to which no barn-yard manure had been applied was much depleted of humus, and hence its power of holding moisture had been lessened, and the conditions for plant growth, apart from the question of plant food, had on this account become less favourable. In 1899 the experiments were modified and an effort made to restore some

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proportion of the humus and at the same time gain further information as to the value of clover as a collector of plant food. In the spring of that year ten pounds of red clover seed per acre was sown with the grain on all the plots of wheat, barley and oats. The clover seed germinated well, and after the grain was cut the young clover plants made rapid growth, and by the middle of October there was a thick mat of foliage varying in height and density on the different plots, which was ploughed under. The growing of carrots and potatoes on one half of the cereal plots has been discontinued since 1898, and each plot of the wheat, barley and oats have occupied the full tenth of an acre.

In 1900, 1901 and 1902 clover was again sown on all the grain plots, and was ploughed under in October. In 1900 and 1901 a good growth of clover was obtained, but in 1902 a severe frost in the spring destroyed a large proportion of the young plants so that the crop available for ploughing under in the autumn was very light.

APPLICATION OF FERTILIZERS DISCONTINUED.

Another direction in which information was sought was in reference to the length of time which a liberal application of barn-yard manure would continue to affect subsequent crops, and in 1899 on plots 1, 2 and 6 the barn-yard manure, which had been used for ten or eleven years in succession, was discontinued. The phosphate fertilizer was also omitted on plot 6 in each series.

In 1900 all the fertilizers on all the plots were discontinued, and it is proposed to continue to grow the same crops on all these plots from year to year without fertilizers for some years, sowing clover with the grain each season. In this way it is expected that much information will be gained as to the value of clover as a collector of plant food, and also as to the unexhausted values of the different fertilizers which have been used on these plots since the experiments were begun.

SPECIAL TREATMENT OF PLOTS OF INDIAN CORN AND ROOTS.

As it was not practicable to sow clover to advantage on the Indian corn and root plots, the sowing of these latter crops was discontinued in the spring of 1900 and clover sown in their place in the proportion of 12 pounds per acre, and no fertilizers were applied. The clover on these plots made strong growth, so strong as to necessitate twice cutting during the season, the cut clover being left on the ground in each case to decay and add to the fertility of the soil, and the clover left over for further growth in the spring of 1901, and ploughed under for the roots about May 10, and for corn about the middle of that month. Then roots and Indian corn were again sown. This course will be continued for some years, growing Indian corn and roots every second year alternating these crops with clover. No fertilizers were applied in 1900 or 1901, and it is proposed to discontinue their use entirely for some years, so that the effect on these crops of the ploughing under of clover may be carefully studied under the varying conditions presented by these more or less exhausted plots.

WHEAT PLOTS.

The seed sown on each of these plots from the beginning has been in the proportion of $1\frac{1}{2}$ bushels per acre, excepting in 1894; and the varieties used were as follows:— In 1888-89-90 and 1891, White Russian, and in 1892-3, Campbell's White Chaff. In 1894, the Rio Grande wheat was used, when, owing to lack of germinating power in the seed, a larger quantity was required. In 1895, 1896, 1897, 1898, 1899, 1900, 1901 and 1902 Red Fife wheat was used in the usual quantity of $1\frac{1}{2}$ bushels per acre. In 1902, the Red Fife was sown April 30, came up May 8, and was ripe from August 10 to 12.

The season of 1902 has been favourable for the growing of spring wheat at Ottawa, and all the plots have increased in yield notwithstanding that the fertilizers have been discontinued for the past three years. This shows that the ploughing under of the green clover is having a beneficial effect. On the check plots which have been unmanured from the beginning the increase both in grain and straw is remarkable.

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EXPERIMENTS WITH FERTILIZERS ON PLOTS OF WHEAT $\frac{1}{16}$ TH ACRE EACH.

No. of Plot.	Fertilizers applied each Year from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the Autumn.	AVERAGE YIELD FOR FOURTEEN YEARS.		15TH SEASON, 1902, VARIETY RED FIFE.		AVERAGE YIELD FOR FIFTEEN YEARS.	
		Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.
		Per acre.	Per acre.	Per acre.	Per acre.	Per acre.	Per acre.
		Bush. lbs.	Lbs.	Bush. lbs.	Lbs.	Bush. lbs.	Lbs.
1	Barn-yard manure (mixed horse and cow manure) well rotted, 12 tons per acre in 1888; 15 tons per acre each year after to 1898 inclusive. No manure has been applied since then.....	21 49 $\frac{9}{14}$	4,065	30 5	3,885	22 22 $\frac{10}{16}$	4,053
2	Barn-yard manure (mixed horse and cow manure) fresh, 12 tons per acre in 1888; 15 tons per acre each year after to 1898 inclusive. No manure has been applied since then.....	22 14 $\frac{13}{14}$	4,099	29 40	3,865	22 44 $\frac{9}{16}$	4,083
3	Unmanured from the beginning.....	11 2 $\frac{12}{14}$	1,908	16 50	2,650	11 26	1,957
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 a similar weight of the 'Thomas' Phosphate was used. No fertilizers have been applied since then.....	11 17 $\frac{2}{14}$	2,081	19 45	2,270	11 51	2,094
5	Mineral phosphate, untreated, finely ground, 500 lbs., nitrate of soda, 200 lbs. per acre used each year from 1888 to 1897 inclusive. In 1898 and 1899 500 lbs. of the 'Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	12 36 $\frac{11}{14}$	2,853	14 10	2,420	12 43	2,824
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1888 to 1897 inclusive. In 1898 500 lbs. of Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	19 6 $\frac{4}{14}$	3,371	24 40	3,115	19 28 $\frac{8}{16}$	3,354
7	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 500 lbs. of the 'Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	13 4	2,608	17 5	3,035	13 20 $\frac{1}{16}$	2,636
8	Mineral phosphate, untreated, finely ground, 500 lbs., wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 500 lbs. of the 'Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	11 5 $\frac{8}{14}$	2,154	15 30	2,770	11 23 $\frac{3}{16}$	2,195
9	Mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.....	11 55 $\frac{13}{14}$	1,923	16 25	2,480	12 13 $\frac{13}{16}$	1,965
10	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	13 1 $\frac{1}{14}$	3,009	14 55	2,135	13 8 $\frac{13}{16}$	2,951

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EXPERIMENTS WITH FERTILIZERS ON PLOTS OF WHEAT $\frac{1}{16}$ TH ACRE EACH—*Continued.*

No. of plot.		AVERAGE YIELD FOR FOURTEEN YEARS.		15TH SEASON, 1902. VARIETY, RED FIFE.		AVERAGE YIELD FOR FIFTEEN YEARS.	
		Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.
		Per acre.	Per acre	Per acre.	Per acre	Per acre.	Per acre
		Bush. lbs.	Lbs.	Bush. lbs.	Lbs.	Bush. lbs.	Lbs.
	Fertilizers applied each year from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn.						
11	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897 inclusive. No fertilizers have been applied since then.....	14 23 $\frac{13}{14}$	2,887	14 40	3,220	14 25	2,969
12	Unmanured from the beginning.....	10 10	1,931	14	2,065	10 25 $\frac{1}{2}$	1,940
13	Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.	12 18 $\frac{11}{14}$	2,021	15 55	2,550	12 33 $\frac{3}{5}$	2,056
14	Bone, finely ground, 500 lbs.; wood ashes unleached, 1,500 lbs. per acre; used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	15 7 $\frac{2}{14}$	2,573	18 20	3,700	15 20	2,648
15	Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	13 48 $\frac{8}{14}$	2,395	16 55	3,395	14 1	2,462
16	Muriate of potash, 150 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	15 30 $\frac{3}{14}$	2,187	19 5	2,985	15 44 $\frac{8}{15}$	2,240
17	Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	12 38 $\frac{10}{14}$	2,370	17 15	2,865	12 57 $\frac{2}{15}$	2,403
18	Sulphate of iron, 60 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	12 35 $\frac{10}{14}$	1,932	16 30	3,060	12 51 $\frac{5}{15}$	2,007
19	Common salt (Sodium chloride), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.....	13 36	1,560	17 30	2,755	13 51 $\frac{4}{15}$	1,640
20	Land plaster or gypsum (Calcium sulphate), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.....	12 37	1,908	16	2,940	12 50 $\frac{8}{15}$	1,977
21	Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been used since then.....	13 6	1,904	14 15	2,875	13 10 $\frac{2}{15}$	1,969

BARLEY PLOTS.

The quantity of seed sown per acre on the barley plots was 2 bushels in 1889, 1890 and 1891, $1\frac{1}{2}$ bushels in 1892 and 1893, and 2 bushels in 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901 and 1902. Two-rowed barley has been used for seed throughout until 1902 when Mensury a six-rowed sort was tried. The varieties used were as follows: 1889, 1890, and 1891, Saale; 1892, Goldthorpe; 1893, Duck-bill; and in 1894, 1895, 1896, 1897, 1898, 1899, 1900 and 1901, Canadian Thorpe, a selected form of the Duck-bill. In 1902 the Mensury was sown on April 16, came up May 1, and was harvested from July 27 to 29.

2-3 EDWARD VII., A. 1903

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF BARLEY, $\frac{1}{10}$ TH ACRE EACH.

No. of plot.	Fertilizers applied each year from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn.	AVERAGE YIELD FOR THIRTEEN YEARS.		14TH SEASON, 1902. VARIETY, MENSURY.		AVERAGE YIELD FOR FOURTEEN YEARS.	
		Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.
		Per acre.	Per acre	Per acre.	Per acre	Per acre.	Per acre
		Bush. lbs.	Lbs.	Bush. lbs.	Lbs.	Bush. lbs.	Lbs.
1	Barn-yard manure, well rotted, 15 tons per acre each year to 1898, inclusive. No manure has been applied since then.....	34 23 $\frac{7}{8}$	3,021	43 6	3,930	35 5 $\frac{2}{4}$	3,086
2	Barn-yard manure, fresh, 15 tons per acre, each year to 1898, inclusive. No manure has been applied since then.....	34 35 $\frac{5}{8}$	3,195	40 45	4,010	35 8 $\frac{7}{4}$	3,253
3	Unmanured from the beginning.....	12 42 $\frac{1}{3}$	1,482	27 4	2,330	13 43 $\frac{7}{4}$	1,543
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 a similar weight of the Thomas' phosphate was used, no fertilizers have been applied since then.	14 7 $\frac{1}{3}$	1,446	29 28	2,270	15 12 $\frac{1}{4}$	1,505
5	Mineral phosphate, untreated, finely ground, 500 lbs., nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	20 16 $\frac{2}{3}$	2,205	29 13	2,410	20 47 $\frac{1}{4}$	2,220
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1888 to 1897, inclusive. In 1898 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	27 19 $\frac{1}{3}$	2,394	40 10	2,525	28 15 $\frac{1}{4}$	2,403
7	Mineral phosphate, untreated, finely ground, 500 lbs., nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	24 32 $\frac{6}{8}$	2,355	42 34	2,700	25 46 $\frac{1}{4}$	2,380
8	Mineral phosphate, untreated, finely ground, 500 lbs., wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	19 29 $\frac{2}{3}$	1,729	40 ..	3,010	21 3 $\frac{1}{4}$	1,821
9	Mineral superphosphate, No. 1, 500 lbs. per acre used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.	20 4 $\frac{8}{8}$	1,753	35 15	1,805	21 8 $\frac{1}{4}$	1,757
10	Mineral superphosphate, No. 1, 350 lbs., nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.	27 23 $\frac{8}{8}$	2,388	35 25	2,125	28 3 $\frac{2}{4}$	2,369

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EXPERIMENTS WITH FERTILIZERS ON PLOTS OF BARLEY, $\frac{1}{16}$ ACRE EACH.

No. of plot.		AVERAGE YIELD FOR THIRTEEN YEARS.		14TH SEASON, 1902. VARIETY, MENSURY.		AVERAGE YIELD FOR FOURTEEN YEARS.	
		Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.
		Per acre.	Per acre	Per acre.	Per acre	Per acre.	Per acre
		Bush. lbs.	Lbs.	Bush. lbs.	Lbs.	Bush. lbs.	Lbs.
	Fertilizers applied each year, from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn.						
11	Mineral superphosphate, No. 1, 350 lbs. ; nitrate of soda, 200 lbs. ; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then..	25 32 $\frac{4}{13}$	2,484	41 42	2,545	26 39 $\frac{1}{4}$	2,488
12	Unmanured from the beginning.....	12 33 $\frac{8}{13}$	1,237	26 12	1,050	13 32 $\frac{1}{4}$	1,224
13	Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	13 37 $\frac{7}{13}$	1,430	26 47	1,220	14 34 $\frac{1}{4}$	1,415
14	Bone, finely ground, 500 lbs. ; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	22 26 $\frac{4}{13}$	2,051	41 2	2,370	23 41 $\frac{1}{4}$	2,074
15	Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	21 28 $\frac{2}{13}$	2,334	30 20	1,640	22 10 $\frac{6}{14}$	2,284
16	Muriate of potash, 150 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	22 7 $\frac{1}{13}$	1,843	33 41	2,095	22 41 $\frac{2}{14}$	1,861
17	Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	18 22 $\frac{7}{13}$	1,949	30 25	1,860	19 15 $\frac{1}{4}$	1,943
18	Sulphate of iron, 60 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	17 30 $\frac{2}{13}$	1,680	33 16	1,585	18 36	1,673
19	Common salt (Sodium chloride), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.....	27 4 $\frac{5}{13}$	1,846	36 22	2,530	27 36 $\frac{7}{14}$	1,895
20	Land plaster or gypsum (Calcium sulphate), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.....	19 27 $\frac{8}{13}$	1,582	29 38	1,910	20 14 $\frac{2}{14}$	1,605
21	Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	19 46 $\frac{1}{13}$	1,746	34 8	2,265	20 46 $\frac{1}{14}$	1,783

OAT PLOTS.

The quantity of seed sown per acre on the oat plots, was 2 bushels in 1889 and 1890 ; $1\frac{1}{2}$ bushels in 1891, 1892 and 1893, and 2 bushels in 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901 and 1902. The varieties used were as follows : In 1889, Early English ; in 1890, 1891, 1892, 1893, Prize Cluster ; and in 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901 and 1902, Banner. In 1902 the Banner was sown April 16, came up May 1, and the plots were harvested from August 2 to 4.

2-3 EDWARD VII., A. 1903

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF OATS, $\frac{1}{10}$ ACRE EACH.

Number of Plot.	Fertilizers applied each year, from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn.	AVERAGE YIELD FOR THIRTEEN YEARS.		14TH SEASON, 1902. VARIETY, BANNER.		AVERAGE YIELD FOR FOURTEEN YEARS.				
		Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.			
		Per acre.	Per acre	Per acre.	Per acre	Per acre.	Per acre			
		Bush. lbs.	Lbs.	Bush. lbs.	Lbs.	Bush. lbs.	Lbs.			
1	Barn-yard manure, well rotted, 15 tons per acre each year to 1898, inclusive. No manure has been applied since then	50	31 $\frac{2}{3}$	3,216	57	17	3,565	51	13 $\frac{2}{4}$	3,241
2	Barn-yard manure, fresh, 15 tons per acre each year to 1898, inclusive. No manure has been applied since then	55	13 $\frac{6}{13}$	3,405	59	4	3,740	55	22 $\frac{7}{14}$	3,422
3	Unmanured from the beginning.	33	7 $\frac{2}{13}$	1,609	46	11	2,725	34	5 $\frac{1}{14}$	1,689
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 a similar weight of the Thomas' phosphate was used. No fertilizers have been applied since then	32	33 $\frac{6}{13}$	1,763	50	5	2,725	34	7 $\frac{2}{14}$	1,832
5	Mineral phosphate, untreated, finely ground, 500 lbs. nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	49	5 $\frac{3}{13}$	2,673	52	22	2,590	49	13 $\frac{1}{14}$	2,667
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1888 to 1897, inclusive. In 1898, 500 lbs. of Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	47	24 $\frac{9}{13}$	2,688	57	32	3,130	48	15 $\frac{7}{14}$	2,720
7	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	48	19 $\frac{5}{13}$	3,170	57	27	2,915	49	7 $\frac{1}{14}$	3,152
8	Mineral phosphate, untreated, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	42	7 $\frac{5}{13}$	2,432	55	5	2,955	43	4 $\frac{1}{14}$	2,469
9	Mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been used since then	36	29 $\frac{6}{13}$	1,947	45	20	2,300	37	16 $\frac{2}{14}$	1,972
10	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.	47	3 $\frac{7}{13}$	2,721	52	32	2,330	47	17 $\frac{10}{14}$	2,693
11	Mineral superphosphate, No. 1, 350 lbs. nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897, inclusive. No fertilizers have been applied since then.	37	31 $\frac{5}{13}$	2,410	51	6	2,490	38	29 $\frac{8}{14}$	2,416
12	Unmanured from the beginning.	22	14 $\frac{4}{13}$	1,431	32	12	970	23	4 $\frac{6}{14}$	1,398
13	Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.	34	13 $\frac{8}{13}$	2,034	39	24	2,050	34	26 $\frac{7}{14}$	2,035

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EXPERIMENTS WITH FERTILIZERS ON PLOTS OF OATS $\frac{1}{10}$ ACRE EACH—Continued.

No. of Plot.	Fertilizers applied each year, from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn.	AVERAGE YIELD FOR THIRTEEN YEARS.		14TH SEASON, 1902. VARIETY, BANNER.		AVERAGE YIELD FOR FOURTEEN YEARS.	
		Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.
		Per acre.	Per acre.	Per acre.	Per acre.	Per acre.	Per acre.
		Bush lbs.	Lbs.	Bush. lbs.	Lbs.	Bush. lbs.	Lbs.
14	Bone, finely ground, 500 lbs. ; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.	40 19 $\frac{8}{13}$	2,241	50 25	2,695	41 10 $\frac{4}{14}$	2,273
15	Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.	47 22	2,736	47 27	3,055	47 22 $\frac{5}{14}$	2,759
16	Muriate of potash, 150 lbs. per acre, used each year from 1898 to 1899 inclusive. No fertilizers have been applied since then.	37 23 $\frac{7}{13}$	2,162	52 27	2,790	38 26 $\frac{3}{14}$	2,207
17	Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.	44 27 $\frac{6}{13}$	2,859	52 12	2,320	45 11 $\frac{11}{14}$	2,820
18	Sulphate of iron, 60 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.	37 5 $\frac{7}{13}$	2,023	54 9	1,955	38 13 $\frac{1}{14}$	2,018
19	Common salt (Sodium chloride) 300 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.	36 26 $\frac{5}{13}$	1,941	50 10	2,150	37 25 $\frac{3}{14}$	1,956
20	Land plaster or gypsum (Calcium sulphate) 300 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.	33 29 $\frac{12}{13}$	1,957	46 1	1,985	34 25 $\frac{6}{14}$	1,959
21	Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899, inclusive. No fertilizers have been applied since then.	34 33 $\frac{8}{13}$	1,854	43 3	2,015	35 19	1,860

INDIAN CORN PLOTS.

The experiments with the plots of Indian corn have been conducted with the object of obtaining the largest weight of well matured green fodder for the silo, and to have the corn so far advanced when cut, that the ears shall be as far as is practicable in the the late milk, or glazed condition. Each plot has been divided from the outset into two equal parts, on one of which—known as No. 1—one of the stronger growing and somewhat later ripening sorts has been tried, and on the other, marked No. 2, one of the earlier maturing varieties. During the first four years one of the Dent varieties was tested under No. 1. The Mammoth Southern Sweet was tried in 1888, 1889 and 1890. In 1891 the Red Cob Ensilage was used, and in 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1901 and 1902 a free growing Flint variety, the Rural Thoroughbred White Flint, was tested. On the other half of the plot (No. 2) the Canada Yellow Flint was used in 1888, 1889 and 1890, the Thoroughbred White Flint in 1891, Pearce's Prolific in 1892, 1893 and 1894, and the Mammoth Eight Rowed Flint in 1895, 1896, 1897, 1898, 1899, 1901 and 1902. For the first four years the No. 1 series was planted in drills 3 feet apart, using about 24 pounds of seed to the acre and thinning the plants, when up, to 6 or 8 inches, and the No. 2 in hills 3 feet apart each way and 4 or 5 kernels in a hill. During the past seven years both sorts have been grown in hills.

In 1900 no crop of Indian corn was grown on these plots, but clover was sown in its place on May 5 in the proportion of twelve pounds per acre. This made a strong growth was cut twice during the season and left on the ground to decay so that when ploughed under the land might get the full benefit of the clover crop. The clover was allowed to remain growing until May 20, 1901, by which time it had made a very heavy growth. It was then ploughed under about six inches deep, and harrowed well before the corn was planted. The corn in both series of plots was planted in 1902, on May 26, and cut for ensilage on September 25.

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF INDIAN CORN, 1/3TH ACRE EACH, CUT GREEN FOR ENSILAGE.

No. of Plot.	Fertilizers applied each year from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1900 in place of the corn and ploughed under in May, 1901, before the corn was planted.	AVERAGE YIELD FOR THIRTEEN YEARS.		14TH SEASON, 1902.		AVERAGE YIELD FOR FOURTEEN YEARS.	
		1/2 Plot No. 1— weight of green fodder	1/2 Plot No. 2— weight of green fodder	1/2 Plot No. 1— Thoroughb'd White Flint weight of green fodder	1/2 Plot No. 2— Mam. 8 row- ed, weight of green fodder	1/2 Plot No. 1— weight of green fodder	1/2 Plot No. 2— weight of green fodder
		Per acre.	Per acre	Per acre.	Per acre	Per acre.	Per acre
		Tons lbs.	Tons lbs	Tons lbs.	Tons lbs	Tons lbs.	Tons lbs
1	Barn-yard manure (mixed horse and cow manure) well rotted, 12 tons per acre, each year from 1888 to 1898 inclusive. No manure has been applied since then..	16 508	12 1,521	18	17 560	16 757	13 167
2	Barn-yard manure (mixed horse and cow manure) fresh, 12 tons per acre each year from 1888 to 1898 inclusive. No manure has been applied since then.....	16 1,383	11 860	11 800	12	16 627	11 941
3	Unmanured from the beginning.	7 646	5 672	3	2 200	7 28	5 209
4	Mineral phosphate, untreated, finely ground, 800 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 a similar weight of the Thomas' phosphate was used. No fertilizers have been applied since then.....	7 1,668	5 75	9 800	3 840	7 1,749	4 1,844
5	Mineral phosphate, untreated, finely ground, 800 lbs., nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899, 800 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	11 714	9 664	11 560	3 1,600	11 703	8 1,874
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1888 to 1897 inclusive. In 1898 500 lbs. of Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then..	16 1,017	12 112	12 1,680	10 600	16 493	11 1,861
7	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	15 1,014	11 752	11 1,800	8 1,200	15 499	11 355

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EXPERIMENTS WITH FERTILIZERS, ON PLOTS OF INDIAN CORN—*Concluded.*

No. of plot.		AVERAGE YIELD FOR THIRTEEN YEARS.		14TH SEASON, 1902.		AVERAGE YIELD FOR FOURTEEN YEARS.	
		Plot No. 1— weight of green fodder	Plot No. 2— weight of green fodder	Plot No. 1— Thoroughb'd White Flint, weight of green fodder	Plot No. 2— Mam. 8 row- ed, weight of green fodder	Plot No. 1— weight of green fodder	Plot No. 2— weight of green fodder
		Per acre.	Per acre	Per acre.	Per acre	Per acre.	Per acre
		Tons. lbs.	Tons. lbs.	Tons. lbs.	Tons. lbs.	Tons. lbs.	Tons. lbs.
	Fertilizers applied each year, from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1900 in place of the corn and ploughed under in May, 1901, before the corn was planted.						
8	Mineral phosphate, untreated, finely ground, 500 lbs., wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	12 300	9 701	11 200	8 1,800	12 150	9 637
9	Mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.....	11 828	8 1,678	9 ..	6 600	11 483	8 1,315
10	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	13 1,713	10 1,667	9 1,200	6 800	13 1,105	10 1,034
11	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	16 1,010	12 1,005	13 240	9 1,520	16 526	12 613
12	Unmanured from the beginning... ..	11 233	9 215	9 560	7 920	10 1,970	8 1,979
13	Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	12 360	9 1,011	12 520	7 1,840	12 371	9 784
14	Bone, finely ground 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	12 1,482	9 1,583	14 400	11	12 1,690	9 1,755
15	Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	13 3	10 7	8 400	5 1,600	12 1,317	9 1,406
16	Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	13 662	10 859	10 1,840	5 1,320	13 317	10 178
17	Mineral superphosphate, No. 1, 600 lbs.; muriate of potash, 200 lbs.; sulphate of ammonia, 150 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	13 1,320	9 1,953	11 1,800	9 1,600	13 1,069	9 1,927
18	Muriate of potash, 300 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	9 1,762	6 1,951	10 800	8 1,600	9 1,836	7 211
19	Double sulphate of potash and magnesia, 300 lbs. per acre in 1889 and '90; (muriate of potash, 200 lbs., substituted each year since); dried blood, 300 lbs.; mineral superphosphate, No. 1, 500 lbs., per acre, used each year from 1889 to 1899, inclusive. No fertilizers have been applied since then..	12 717	8 1,665	11 640	9	12 569	8 1,689
20	Wood ashes, unleached, 1,900 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	10 1,615	8 276	11 1,360	8 1,400	10 1,739	8 356
21	Bone, finely ground, 500 lbs.; sulphate of ammonia, 200 lbs.; muriate of potash, 200 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	12 1,955	7 1,011	8 1,440	8 1,760	12 1,347	7 1,207

PLOTS OF MANGELS AND TURNIPS.

In conducting these experiments the roots only have been taken from the land, the tops have always been cut off and left on the ground to be ploughed under, so that the plant food they have taken from the soil may be returned to it. One-half of each one-tenth acre plot in the series has been devoted to the growth of mangels, and the other half to turnips, and these crops have been alternated from year to year. The preparation of the land has been the same for both these roots. It was ploughed in the autumn after the crop was gathered, gang-ploughed deeply in the spring after the barnyard manure had been spread on plots 1, 2 and 6, and after gang-ploughing, the other fertilizers were spread by scattering them evenly over the surface, after which it was all harrowed with the smoothing harrow, then made in ridges 2 feet apart, rolled and sown.

In 1889, the variety of mangel used was the Mammoth Long Red. In 1890, three varieties were sown: 15 rows of Mammoth Long Red, 6 of Mammoth Long Yellow, and 6 of Golden Intermediate on each plot. In 1891, each plot again had three varieties: 18 rows of Mammoth Long Red, 3 of Yellow Fleshed Tankard, and 6 of Golden Tankard. In 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1901 and 1902, one variety only was used, namely, the Mammoth Long Red. About 4 pounds of seed were sown per acre each year.

Two varieties of turnips were sown on the half plots devoted to these roots in 1889; 25 rows of Carter's Prize Winner, and 2 rows of Carter's Queen of Swedes, and in 1890, a single variety, Carter's Elephant Swede. In 1891, six varieties were sown: 6 rows of Lord Derby Swede, 4 of New Giant King, 3 of Imperial Swede, 6 of Champion Swede, 4 of Purple Top Swede, and 4 of East Lothian Swede. In 1892 the Improved Purple Top Swede only was sown, in 1893 and 1894 the Prize Purple Top Swede, in 1895 the Imperial Swede, and in 1896, 1897, 1898, 1899, 1901 and 1902 the Prize Purple Top Swede. The land used for the turnips, which are usually sown later than the mangels, was prepared in the same manner and the fertilizers spread on it at the same time as for the mangels. It was then allowed to stand until the day before sowing, when it was gang-ploughed shallow or cultivated to kill weeds and loosen the soil, ridged, rolled and sown. About three pounds of seed were sown per acre,

In 1900 no crops of mangels and turnips were grown, but clover was sown in their place on May 5 in the proportion of twelve pounds per acre. This made a strong growth, and was cut twice during the season, and left on the ground to decay so that when ploughed under, the land might get the full benefit of the clover crop. The clover was allowed to remain growing until May 10, 1901, by which time it had made a very heavy growth. It was then ploughed under about six inches deep and harrowed well, then made up into ridges two feet apart. These were rolled with a hand roller, which flattened the ridges considerably and made a firm, even seed bed. It is proposed to alternate the crops of clover and roots in this way for some years, for the purpose of gaining information as to the fertilizing effect of crops of green clover ploughed under on land to be used for growing roots.

In 1902 the mangels were sown on May 12, and pulled on October 14; the turnips were sown May 12, and pulled October 14. The yield per acre has been calculated in each case from the weight of roots gathered from two rows, each 66 feet long.

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EXPERIMENTS WITH FERTILIZERS ON ROOTS: PLOTS OF MANGELS AND TURNIPS
1/20TH ACRE EACH.

No. of Plot.	Fertilizers applied each year from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1900 in place of the roots and ploughed under in May, 1901, before the roots were sown.	AVERAGE YIELD FOR TWELVE YEARS.		13TH SEASON, 1902. VARIETIES.		AVERAGE YIELD FOR THIRTEEN YEARS.	
		Mangels, Weight of Roots.	Turnips, Weight of Roots.	West Half Plot.	East Half Plot.	Mangels, Weight of Roots.	Turnips, Weight of Roots.
		Per Acre.	Per Acre.	Per Acre.	Per Acre.	Per Acre.	Per Acre.
		Tons. lbs.	Tons. lbs.	Tons. lbs.	Tons. lbs.	Tons. lbs.	Tons. lbs.
1	Barn-yard manure (mixed horse and cow manure) well rotted, 20 tons per acre each year from 1889 to 1898 inclusive. No manure has been applied since then.....	22 1,089	15 1,194	23 1,400	16 920	22 1,267	15 1,327
2	Barn-yard manure (mixed horse and cow manure) fresh, 20 tons per acre each year from 1889 to 1898 inclusive. No manure has been applied since then.....	21 1,041	15 1,522	19 1,800	15 1,520	21 792	15 1,522
3	Unmanured from the beginning.....	8 1,756	7 859	11 520	7 920	9 122	7 864
4	Mineral phosphate, untreated, finely ground, 1,000 lbs. per acre, used each year from 1889 to 1897, inclusive. In 1898 and 1899 a similar weight of the Thomas' phosphate was used. No fertilizers have been applied since then.....	8 835	7 1,837	13 480	8 760	8 1,577	7 1,908
5	Mineral phosphate, untreated, finely ground, 1,000 lbs., nitrate of soda, 250 lbs. wood ashes, unleached, 1,000 lbs. per acre, used each year from 1889 to 1897 inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	14 617	10 77	19 840	9 400	14 1,403	9 1,948
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate untreated, finely ground, 1,000 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1889 to 1897 inclusive. In 1898 1,000 lbs. of Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then..	18 264	13 308	16 1,520	10 1,640	18 53	12 1,949
7	Mineral phosphate, untreated, finely ground, 1,000 lbs.; sulphate of potash, 200 lbs. in 1889 and 1890 (substituted by muriate of potash, 250 lbs. in 1891 and subsequent years); nitrate of soda, 200 lbs. per acre, used each year from 1889 to 1897 inclusive. In 1898 and 1899 1,000 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	11 386	9 1,232	16 1,640	8 600	11 1,252	9 1,030
8	Mineral superphosphate, No. 1, 500 lbs.; sulphate of potash, 200 lbs. in 1889 and 1890 (substituted by muriate of potash, 250 lbs. in 1891 and subsequent years); nitrate of soda, 200 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then	13 1,649	12 396	17 280	7 280	14 159	11 1,618

EXPERIMENTS WITH FERTILIZERS ON ROOTS; PLOTS OF MANGELS AND
TURNIPS—*Concluded.*

No. of plot.	Fertilizers applied each Year from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1900 in place of the roots and ploughed under in May, 1901, before the roots were sown.	AVERAGE YIELD FOR TWELVE YEARS.		13TH SEASON, 1902, VARIETIES.		AVERAGE YIELD FOR THIRTEEN YEARS.	
		Mangels, Weight of Roots.	Turnips, Weight of Roots.	West Half Plot.	East Half Plot.	Mangels, Weight of Roots.	Turnips, Weight of Roots.
		Per Acre.	Per Acre.	Per Acre.	Per Acre.	Per Acre.	Per Acre.
		Tons. lbs.	Tons. lbs.	Tons. lbs.	Tons. lbs.	Tons. lbs.	Tons. lbs.
9	Mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	9 341	9 481	15 1,480	8 640	9 1,306	9 339
10	Nitrate of soda, 300 lbs. per acre, used each year from 1889 to 1899, inclusive. No fertilizers have been applied since then.....	14 328	9 1,181	17 760	7 1,760	14 823	9 918
11	Sulphate of ammonia, 300 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	12 538	10 1,715	13 1,200	11 760	12 743	10 1,795
12	Unmanured from the beginning.....	7 449	7 482	10 240	8 690	7 894	7 645
13	Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	12 675	8 1,469	13 840	11 960	12 842	8 1,891
14	Wood ashes, unleached, 2,000 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	10 1,886	8 103	12 360	9 88	11 76	8 317
15	Common salt (Sodium chloride) 400 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	9 1,437	7 927	9 1,240	6 1,600	9 1,422	7 825
16	Mineral superphosphate, No. 1, 500 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	13 173	10 1,908	13	9 1,000	13 130	10 1,896
17	Mineral superphosphate, No. 1, 350 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	12 1,624	9 1,919	22 1,840	15	13 1,179	10 694
18	Mineral superphosphate, No. 1, 500 lbs.; muriate of potash, 200 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	12 1,552	10 1,425	15 1,160	16 60	12 1,93	11 285
19	Double sulphate of potash and magnesia, 300 lbs. per acre in 1889 and 1890 (muriate of potash, 200 lbs., substituted each year since); dried blood, 250 lbs.; mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	14 342	11 1,838	17 560	16 480	14 820	12 503
20	Wood ashes, unleached, 1,500 lbs.; common salt (Sodium chloride), 300 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	14 1,244	10 1,712	21 1,280	9 1,760	15 324	10 1,562
21	Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	14 1,482	11 51	18 840	12 1,490	15 48	11 309

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RESULTS OBTAINED FROM THE PLOUGHING UNDER OF CLOVER.

In 1900 and 1901 further experiments were undertaken to demonstrate the usefulness of the ploughing under of clover to add fertility to the soil. The following tests were made with oats, Indian corn and potatoes showing the effect on these crops in 1902, of clover ploughed under in 1901.

In the second series of tables the effect from the ploughing under of clover in 1900 is shown on the two succeeding crops, those of 1901 and 1902. These experiments were all made on plots of one eightieth of an acre each.

EFFECTS of the Ploughing-under of Green Clover, in 1901, as a Fertilizer for Oats in 1902.

Variety.	Length of Straw.	Length of Head.	Yield of Oats Per Acre.	Weight of Straw Per Acre.
(Banner Oats grown after).	Inches.	Inches.	Bush. Lbs.	Lbs.
Wheat, 1901, no clover.....	49 — 51	9 — 10½	63 18	3,280
" 1901, with "	51 — 53	9 — 10½	72 32	5,280
Barley, 1901, no "	49 — 51	9 — 10½	61 6	2,720
" 1901, with "	51 — 53	9 — 10½	70 20	4,960
Oats, 1901, no "	49 — 51	9 — 10½	58 28	3,120
" 1901, with "	51 — 53	9 — 10½	70 20	4,720

EFFECTS of the Ploughing-under of Green Clover, in 1901, as a Fertilizer for Indian Corn in 1902.

Variety.	Height.	Leafiness.	Condition When Cut.	Weight of Green Fodder Per Acre.
(Selected Leaming grown after).	Inches.			Tons. Lbs.
Wheat, 1901, no clover.....	85 — 95	Medium... ..	Late milk...	16 800
" 1901, with "	110 — 120	Very leafy..	" ...	22 1,600
Barley, 1901, no "	85 — 95	Medium.....	" ...	17 720
" 1901, with "	110 — 120	Very leafy..	" ...	23 1,200
Oats, 1901, no "	85 — 95	Medium	" ...	15 —
" 1901, with "	110 — 120	Very leafy..	" ...	20 800

EFFECTS of the Ploughing-under of Green Clover in 1901, as a Fertilizer for Potatoes in 1902.

Variety.	Yield Per Acre.
(Everett after grown).	Bush. Lbs.
Wheat, 1901, no clover.	353 20
" 1901, with "	396 —
Barley, 1901, no "	346 40
" 1901, with "	386 20
Oats, 1901, no "	358 —
" 1901, with "	392 40

SECOND Series of Plots showing effect of Clover one and two years after Ploughing-under.

Crop Sown in 1900.	1901. Banner Oats.		1902. Everett Potatoes.	
	Yield of Oats Per Acre.	Weight of Straw Per Acre.		
	Bush. Lbs.	Lbs.	Bush. Lbs.	
Wheat, no clover.....	47 2	2,480	274 40	
" with ".....	49 14	3,440	293 20	
Barley, no ".....	37 22	1,920	270 40	
" with ".....	42 12	2,640	272 —	
Oats, no ".....	35 10	2,240	333 20	
" with ".....	40 —	3,040	353 20	

Crop Sown in 1900.	1901. Everett Potatoes.		1902. Corn, Selected Leaming.	
	Bush. Lbs.	Tons. Lbs.		
Wheat, Preston, no clover..	396 40	16 1,600		
" " with ".....	440 —	19 —		
Barley, Mensury, no ".....	396 —	15 880		
" " with ".....	420 —	16 640		
Oats, Banner, no ".....	381 20	16 1,600		
" " with ".....	411 20	20 200		

Crop Sown in 1900.	1901. Corn, Selected Leaming.	1902. Banner Oats.	
		Yield of Oats Per Acre.	Weight of Straw Per Acre.
	Tons. Lbs.	Bush. Lbs.	Lbs.
Wheat, Preston, no clover....	19 1,280	51 26	2,320
" " with ".....	27 1,760	75 10	4,160
Barley, Mensury, no ".....	15 1,600	47 2	2,600
" " with ".....	27 880	70 20	3,920
Oats, Banner, no ".....	20 160	58 28	3,120
" " with ".....	25 1,600	70 20	3,840

EFFECTS OF FERTILIZERS ON SPRING WHEAT, OATS AND AWNLESS BROME GRASS.

During the season of 1900 four series consisting in each case of nine one-eightieth acre plots, were laid out, seven of which were treated with different fertilizers, and the remaining two left as check plots which received no fertilizer.

One set of these plots was sown with spring wheat (Preston), one with oats (Improved Ligowo), a third with Awnless Brome grass *Bromus inermis*, and a fourth with common red clover.

The object in view in these tests is to gain information as to the effects on crops sown on land in a fair average condition of fertility, of superphosphate of lime and

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Thomas' phosphate, both used singly, also of superphosphate of lime with kainit and nitrate of soda, and of Thomas' phosphate with kainit and nitrate of soda.

The land chosen was in a fairly good condition of tilth. The soil was a sandy loam which has been under cultivation since 1887, has been cropped each year with a suitable rotation of crops and has received a dressing of barn-yard manure about once in four years. The last application of manure was in 1897 when it received about 12 tons per acre.

It is proposed to grow the same crops on this land for a series of years, using the same fertilizers in the quantities mentioned every second year. The fertilizers were applied in the spring of 1900 and again in the spring of 1902.

A large proportion of the plants in the plots of common red clover died during the winter of 1901-2, and it was thought best to plough them under and resow in the spring of 1902. Most of the plants from the first sowing were destroyed by a severe spring frost, after which the plots were again sown and the plants had made a medium growth before the close of the season. The first sowing of clover was on May 3, the second on May 23, sown in each instance at the rate of 12 lbs. per acre. The second application of fertilizers was made to these plots before the clover seed was sown in the spring.

RESULTS OF THE APPLICATION OF FERTILIZERS TO SPRING WHEAT.

Sown April 29, ripe August 15.

No. of Plot.	Name of Variety, Preston.	Yield of grain per acre.		Yield of straw per acre.
		Bush.	Lbs.	Lbs.
1	Superphosphate, 400 lbs. per acre	24	—	3,920
2	Thomas' phosphate, 400 lbs. per acre	24	—	3,760
3	Thomas' phosphate, 800 lbs. per acre	28	—	4,240
4	Check	28	—	3,840
5	Thomas' phosphate, 400 lbs., kainit, 200 lbs. per acre	26	40	3,520
6	Superphosphate, 400 lbs., kainit, 200 lbs. per acre	25	20	3,600
7	Check	26	40	3,760
8	Thomas' phosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	30	40	4,240
9	Superphosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	28	—	4,320

RESULTS OF THE APPLICATION OF FERTILIZERS TO OATS.

Sown April 29, ripe August 21.

No. of Plot.	Name of Variety, Improved Ligowo.	Yield of grain per acre.		Yield of straw per acre.
		Bush.	Lbs.	Lbs.
1	Superphosphate, 400 lbs. per acre	60	—	3,800
2	Thomas' phosphate, 400 lbs. per acre	75	10	4,960
3	Thomas' phosphate, 800 lbs. per acre	70	20	4,560
4	Check	75	10	2,480
5	Thomas' phosphate, 400 lbs., kainit, 200 lbs. per acre	68	8	3,680
6	Superphosphate, 400 lbs., kainit, 200 lbs. per acre	68	8	4,400
7	Check	72	32	4,720
8	Thomas' phosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	72	32	4,640
9	Superphosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	63	18	5,680

RESULTS OF THE APPLICATION OF FERTILIZERS TO AWNLESS BROME GRASS.

No. of Plot.	Awnless Brome Grass (<i>Bromus inermis</i>).	Length of Brome Grass.	Yield per Acre, Green.		Yield per Acre, Cured.	
		Inches.	Tons.	Lbs.	Tons.	Lbs.
1	Superphosphate, 400 lbs. per acre	45-50	7	160	3	1,360
2	Thomas' phosphate, 400 lbs. per acre	45-50	6	1,520	3	1,200
3	Thomas' phosphate, 800 lbs. per acre	43-45	5	480	2	1,440
4	Check.	43-45	4	800	2	800
5	Thomas' phosphate, 400 lbs., kainit, 200 lbs. per acre.....	43-45	5	1,200	2	1,360
6	Superphosphate, 400 lbs., kainit, 200 lbs. per acre.....	43-45	5	880	2	1,200
7	Check.	45-47	6	..	3	1,360
8	Thomas' phosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre.....	45-50	7	440	3	400
9	Superphosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre.....	45-50	8	320	3	1,200

DISTRIBUTION OF SAMPLES OF SEED GRAIN TO FARMERS
FOR TRIAL.

A further distribution was made in the spring of 1902, of samples of the most promising sorts of oats, spring wheat, barley, pease, Indian corn and potatoes. By the careful growing of one of these samples, which weigh three pounds each, the farmer can soon provide himself with seed of one of the best sorts sufficient for a large area at no cost beyond that of his own labour. From the many appreciative letters received from farmers who have had these samples and have grown from them the seed grain they are now using on their farms, it is evident that this branch of the work of the experimental farms is doing much good and is rapidly accomplishing the object for which it was begun, that of the general introduction among farmers throughout the Dominion of the best and most productive sorts of these important farm crops. Another proof of the appreciation in which this work is held, is the very large demand each year for samples.

The samples sent out from the Central Experimental Farm during the early months of 1902 were distributed as follows :—

Name of Grain.	Prince Edward Island.	Nova Scotia.	New Brunswick.	Quebec.	Ontario.	Manitoba.	North-west Territories.	British Columbia.
Oats	781	1,421	1,202	5,021	4,272	1,144	583	143
Barley	118	365	163	1,186	539	159	133	63
Wheat	256	474	691	2,102	776	307	295	54
Pease	57	321	274	845	354	265	151	55
Indian corn	39	179	184	640	568	92	55	15
Potatoes.....	167	866	847	3,329	2,170	684	530	198
Total.....	1,418	3,626	3,361	13,123	8,679	2,651	1,747	528

Total number of samples distributed..... 35,133
Number of applicants supplied..... 35,077

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The following list shows the number of three pound packages of the different varieties which have been sent out:—

Name of Variety.	Number of Packages.	Name of Variety.	Number of Packages.
OATS.		PEASE— <i>Con.</i>	
Improved Ligowo	3,021	French Canner.....	75
Banner	2,088	Creeper.....	59
Tartar King	1,848	Prince Albert.....	57
Waverley.....	1,812	New Potter.....	38
Abundance	1,154	Black Eyed Marrowfat.....	34
Wide Awake.....	803	Crown	29
Bavarian.....	755	Alma.....	29
Goldfinder.....	711	Kirly.....	28
New Zealand.....	626	Daniel O'Rourke.....	23
Thousand Dollar.....	574	Mummy	27
Black Beauty.....	305	Paragon	27
American Beauty.....	236	Cooper.....	26
Golden Beauty	207	Prince	26
Early Archangel	104	Duke.....	26
Lincoln	103	King.....	25
Joanette.....	86	Fergus.....	25
Siberian	76	Archer.....	24
Pioneer.....	58	Elephant Blue	24
		German White.....	24
Total	14,567	Vincent.....	22
		Bedford	20
BARLEY.		Bright.....	20
<i>Six-rowed.</i>		Bruce.....	17
		Total	2,322
Mensury.....	1,189	INDIAN CORN.	
Odessa.....	465	Selected Leaming.....	674
Trooper.....	333	Longfellow.....	345
Royal.....	119	Early Butler.....	159
<i>Two-rowed.</i>		Mitchell's Early.....	137
Sidney.....	339	Mammoth Cuban.....	133
Beaver.....	174	Angel of Midnight.....	132
Invincible.....	107	Pearce's Prolific.....	50
Total	2,726	White Cap Yellow Dent.....	47
		Compton's Early.....	42
WHEAT.		King of the Earliest.....	31
Preston.	1,172	Champion White Pearl.....	21
Red Fife.....	515	Canada White Flint.....	1
Percy.....	469	Total	1,772
Stanley.....	459	POTATOES.	
Wellman's Fife.....	425	Wonder of the World....	1,255
White Fife.....	413	Early Sunrise.....	1,205
Huron.....	316	Early Harvest.....	725
Monarch.....	289	Carman No. 1.....	716
Red Fern.....	286	Early Andes.....	597
White Russian.....	277	Everett.....	541
White Connell	272	Late Puritan.....	448
Speltz	61	Bovee.....	399
Goose.....	1	Rochester Rose.....	393
Total	4,955	Vigorosa	336
		Prize Taker.....	253
PEASE.		New Queen.....	215
Large White Marrowfat.....	465	Early White Prize.....	203
Golden Vine.....	451	American Wonder.....	201
Arthur.....	294	Beauty of Hebron.....	191
Prussian Blue.....	165	Canadian Beauty.....	190
Grass Pea.....	122	Sir Walter Raleigh.....	168
Canadian Beauty.....	115	Honeoye Rose.....	149
		Queen of the Valley.....	109

Name of Variety.	Number of Packages.	Name of Variety.	Number of Packages.
POTATOES - Con.			
Maggie Murphy.....	102	Total number of packages distributed—	
Uncle Sam	33	Wheat.....	4,955
Enormous.	27	Oats.....	14,567
Seattle... ..	21	Barley	2,726
With smaller quantities, sent in re-		Pease	2,322
sponse to special requests, of 24 other		Corn.....	1,772
varieties, in all.....	314	Potatoes	8 791
Total	8,791	Total	35,133

DISTRIBUTION OF SAMPLES OF GRAIN SUFFICIENT FOR ONE-TENTH OF AN ACRE.

The distribution of grain in larger samples sufficient in each case for a one-tenth acre plot which was begun in 1899 has been continued. These samples have been sent to a special list of farmers selected from among those who have shown a particular interest in this work, and the samples have been so distributed that no part of the Dominion has been overlooked.

DISTRIBUTION of samples sufficient for one-tenth of an acre.

Name of Grain.	P. E. I.	N. S.	N. B.	Quebec.	Ontario.	Man.	N.W.T.	B. C.
Oats.....	40	104	130	237	591	125	99	14
Spring Wheat.....	36	30	84	280	31	58	63	14
Barley	11	42	20	87	116	38	22	3
Total....	87	176	234	604	738	221	184	31

The following list shows the number of these larger packages of the different varieties which have been sent out :—

Name of Variety.	Number of Packages.	Name of Variety.	Number of Packages.
OATS.		BARLEY.	
Banner.....	343	Mensury.....	162
Tartar King	232	Royal.....	44
Improved Ligowo.....	214	Beaver.....	44
Abundance.....	186	Odessa.....	41
Waverley.....	157	Sidney.....	17
Wide Awake.....	79	Standwell....	14
American Beauty.....	77	Invincible.....	11
Goldfinder	52	Trooper.....	6
Total.	1,310	Total.. ..	339
WHEAT.		SUMMARY.	
Red Fife.....	168	Oats.....	1,340
Preston.....	144	Wheat	596
White Fife.....	128	Barley	339
Wellman's Fife.....	104	Total ...	2,275
Stanley.....	36		
Percy	16		
Total.. ..	596		

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DISTRIBUTION OF SAMPLES FROM THE BRANCH EXPERIMENTAL FARMS.

Samples of three pounds each were also distributed from the branch experimental farms as follows :—

Experimental Farm, Nappan, N.S.—		Experimental Farm, Brandon, Man.—	
Oats.....	208	Samples of grain of all sorts.....	401
Wheat.....	83	Potatoes.....	237
Barley.....	67		
Pease.....	40	Total.....	638
Buckwheat.....	16		
Winter Rye.....	6		
Potatoes.....	325		
Total.....	745		
Experimental Farm, Indian Head, N. W.T.—		Experimental Farm, Agassiz, B.C.—	
Oats.....	380	Oats.....	147
Barley.....	264	Barley.....	113
Wheat.....	265	Wheat.....	209
Pease.....	230	Pease.....	123
Flax, Rye, &c.....	111	Potatoes.....	268
Potatoes.....	725		
Total.....	1,975	Total.....	860

These samples added to the number distributed by the Central Experimental Farm make a total of 41,626. It is gratifying to find so large an army of co-experimenters willing to engage in this good work.

TESTS OF THE VITALITY OF SEED GRAIN AND OTHER SEEDS FOR 1901-2

The number of samples of seed grain and other seeds tested during the season of 1901-2 to find out the proportion which would germinate was 1,830. These tests are continued from year to year so that farmers may have the opportunity of having any samples which may be of doubtful vitality, through injury in harvesting or storing, thoroughly tested so that their value for seed purposes may be known. Samples may be sent free through the mail, about one ounce is sufficient, and the work is done and reported on free of charge. The tests can usually be completed within a fortnight after the samples are received.

RESULTS OF TESTS OF SEEDS FOR VITALITY, 1901-2.

Kind of Seed.	Number of Tests.	Highest Per-centage.	Lowest Per-centage.	Per-centage of Strong Growth.	Per-centage of Weak Growth.	Average Vitality.
Wheat.....	584	100·0	3·0	83·9	4·1	88·0
Barley.....	395	100·0	0·0	82·3	7·4	89·7
Oats.....	620	100·0	6·0	83·6	5·7	89·4
Rye.....	2	76·0	56·0	64·5	1·5	66·0
Pease.....	176	100·0	40·0			89·3
Corn.....	8	100·0	2·0			66·2
Clover.....	10	92·0	12·0			73·3
Grass.....	7	97·0	7·0			74·4
Tares.....	2	78·0	3·0			40·5
Onion.....	2	52·0	52·0			52·0
Flax.....	8	61·0	26·0			52·3
Sunflower.....	3	88·0	72·0			78·6
Cucumber.....	4	16·0	2·0			9·0
Radish.....	3	76·0	15·0			40·3
Lettuce.....	1	18·0	18·0			18·0
Squash.....	1	6·0	6·0			6·0
Celery.....	1	78·0	78·0			78·0
Canary Seed.....	1	54·0	54·0			54·0
Amber Sugar Cane.....	1	4·0	4·0			4·0
Apple.....	1	0·0	0·0			0·0
Total number of samples tested, highest and lowest percentage.	1830	100·0	0·0			

(Signed) WILLIAM T. ELLIS.

TABLE showing the Results of Grain Tests for each Province.

ONTARIO.

Kind of Seed.	Number of Tests.	Highest Per-centage.	Lowest Per-centage.	Per-centage of Strong Growth.	Per-centage of Weak Growth.	Average Vitality.
Wheat.....	178	99·0	3·0	76·9	6·4	83·3
Barley.....	105	100·0	0·0	74·4	10·5	84·9
Oats.....	221	100·0	6·0	86·3	4·3	90·7

QUEBEC.

Wheat.....	49	100·0	63·0	86·4	4·8	91·3
Barley.....	63	100·0	83·0	92·4	4·1	96·5
Oats.....	55	100·0	33·0	84·5	3·6	88·2

MANITOBA.

Wheat.....	135	100·0	59·0	88·6	2·9	91·5
Barley.....	84	100·0	49·0	74·1	10·5	84·7
Oats.....	118	100·0	31·0	86·7	6·3	93·1

NORTH-WEST TERRITORIES.

Wheat.....	179	100·0	44·0	80·3	3·1	83·4
Barley.....	65	100·0	61·0	84·0	5·4	89·5
Oats.....	121	100·0	6·0	69·8	10·4	80·3

NOVA SCOTIA.

Wheat.....	24	99·0	84·0	91·8	2·7	94·6
Barley.....	38	100·0	74·0	89·8	5·2	95·0
Oats.....	32	100·0	50·0	90·2	3·4	93·6

NEW BRUNSWICK.

Wheat.....	55	100·0	74·0	91·2	2·5	93·8
Barley.....	22	100·0	89·0	93·8	3·4	97·2
Oats.....	32	100·0	77·0	90·1	3·5	93·6

PRINCE EDWARD ISLAND.

Wheat.....	23	100·0	80·0	94·3	1·7	96·0
Barley.....	16	100·0	86·0	94·5	3·1	97·7
Oats.....	31	100·0	76·0	89·6	4·0	93·7

BRITISH COLUMBIA.

Wheat.....	1	84·0	84·0	81·0	3·0	84·0
Barley.....	2	97·0	92·0	91·0	3·5	94·5
Oats.....	10	100·0	62·0	87·4	5·0	92·4

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METEOROLOGICAL OBSERVATIONS.

Table of Meteorological Observations taken at the Central Experimental Farm, Ottawa, 1902; maximum and minimum temperatures, with date of occurrence, and mean temperature for each month, also rainfall and snowfall and total precipitation.

Month.	Maximum.	Minimum.	Range.	Mean.	Highest.	Date.	Lowest.	Date.	Rainfall.	Snowfall.	Total Pre- cipitation.	Number of days Pre- cipitation.	Heaviest in 24 hours.	Date.
	F°	F°	F°	F°	F°		F°		in.	in.	in.		in.	
January...	20·54	1·32	19·21	10·92	37·0	3rd, 27th	-19·0	17th	0·79	40·00	4·79	15	2·09	22nd
February..	24·20	6·10	18·09	15·14	42·4	27th	-13·0	4th	0·07	21·75	2·24	10	0·70	2nd
March....	41·68	25·74	15·94	33·71	58·8	28th	6·0	19th	3·50	1·25	3·62	12	0·96	29th
April.....	56·24	34·66	21·58	45·45	78·0	29th	25·0	5th	2·93	.....	2·93	13	1·09	30th
May.....	65·02	42·33	22·69	53·67	86·0	23rd	19·0	10th	1·62	....	1·62	13	0·42	24th
June.....	71·80	47·63	22·16	58·71	84·0	3rd	37·8	11th	4·19	.....	4·19	18	0·71	26th
July.....	80·32	57·07	23·25	68·69	92·0	8th	49·0	16th	4·03	.....	4·03	15	2·04	15th
August....	76·46	53·31	23·15	64·88	87·5	31st	41·9	17th	1·82	.....	1·82	12	1·08	21st
September.	70·90	50·05	20·85	60·47	81·3	21st	36·2	6th	1·79	.....	1·79	11	0·73	23rd
October....	52·02	34·32	17·69	43·16	66·2	13th	19·0	30th	3·08	1·00	3·18	16	0·58	6th
November..	44·80	29·44	15·36	37·12	61·2	6th	6·0	29th	1·45	5·00	1·95	12	0·75	12th
December..	22·75	4·98	17·77	13·86	38·5	19th	-25·2	9th	0·67	32·75	3·91	15	1·05	10th
									25·94	101·75	36·10	162		

Rain or snow fell on 162 days during the 12 months.

Heaviest rainfall in 24 hours, 2·04 inches on July 15.

Heaviest snowfall in 24 hours, 14 inches on January 22.

The highest temperature during the 12 months was 92·0° on July 8.

The lowest temperature during the 12 months was—25·2° on December 9.

During the growing season rain fell on 13 days in April, 13 days in May, 18 days in June, 15 days in July, 12 days in August, and 11 days in September.

February shows the lowest number of days with precipitation, viz., 10.

Total precipitation during the 12 months 36·10 inches, as compared with 38·91 inches during 1901.

RAINFALL, Snowfall and total Precipitation from 1890 to 1902, also the average annual amount that has fallen.

Year.	Rainfall.	Snowfall.	Total Precipitation.
	In inches.	In inches.	In inches.
1890.....	24·73	64·85	31·22
1891.....	30·19	73·50	37·54
1892.....	23·78	105·00	34·28
1893.....	31·79	72·50	39·04
1894.....	23·05	71·50	30·20
1895.....	27·01	87·50	35·76
1896.....	21·53	99·75	31·50
1897.....	24·18	89·00	33·08
1898.....	24·75	112·25	36·02
1899.....	33·86	77·25	41·63
1900.....	29·48	108·00	40·27
1901.....	29·21	97·25	38·91
1902.....	25·94	101·75	36·10
Yearly average for 13 years.....	26·88	89·23	35·81

RECORD of Sunshine at the Central Experimental Farm, Ottawa, for the Years 1899 to 1902.

Months.	1899.				1900.				1901.				1902.			
	Number of days with Sunshine.	Number of days without Sunshine.	Total hours Sunshine	Average Sunshine per Day.	Number of days with Sunshine.	Number of days without Sunshine.	Total hours Sunshine	Average Sunshine per Day.	Number of days with Sunshine.	Number of days without Sunshine.	Total hours Sunshine	Average Sunshine per Day.	Number of days with Sunshine.	Number of days without Sunshine.	Total hours Sunshine	Average Sunshine per Day.
January	18	13	91.2	2.94	18	13	76.4	2.46	20	11	94.6	3.05	21	10	97.2	3.13
February ...	19	9	102.1	3.64	20	8	110.2	3.93	20	8	120.9	4.31	20	8	93.3	3.33
March	17	14	124.1	4.00	26	5	177.9	5.73	19	12	82.4	2.62	25	6	136.2	4.39
April	26	4	228.8	7.62	26	4	212.7	7.09	18	12	137.1	4.57	26	4	161.9	5.39
May	27	4	225.4	7.27	27	4	241.6	7.79	25	6	200.8	6.47	27	4	229.8	7.41
June	29	1	257.1	8.57	27	3	282.2	9.40	29	1	269.4	8.98	29	1	185.6	6.18
July	29	2	271.3	8.75	29	2	225.1	7.26	29	2	245.8	7.92	31	0	239.9	7.73
August	31	0	271.2	8.74	30	1	270.7	8.73	29	2	226.1	7.29	31	0	252.0	8.12
September..	22	8	128.9	4.29	22	8	164.4	5.48	26	4	202.3	6.74	25	5	145.0	4.83
October ...	23	8	120.4	3.88	26	5	148.7	4.79	27	4	126.3	4.07	24	7	99.2	3.20
November..	17	13	77.0	2.56	18	12	71.7	2.39	19	11	72.4	2.41	21	9	82.5	2.75
December..	17	14	50.1	1.61	16	15	34.0	1.09	16	15	45.4	1.46	16	15	58.4	1.88

(Signed) WILLIAM T. ELLIS,
Observer.

CORRESPONDENCE.

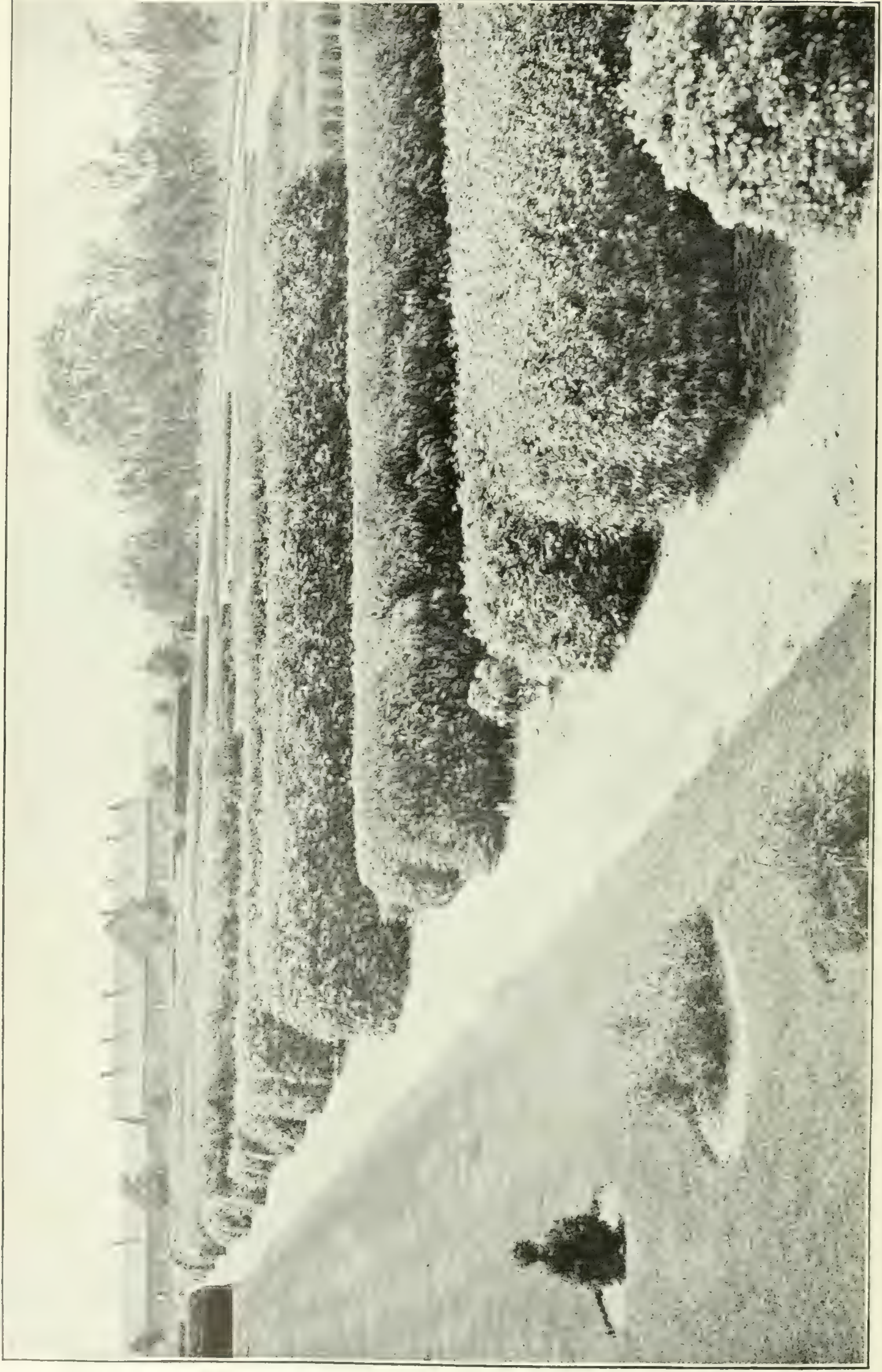
The large correspondence between Canadian farmers and the officers of the Experimental Farms has been well maintained during 1902. A large proportion of the letters received are from correspondents who seek information on all sorts of subjects relating to farm-work, stock raising, dairying, fruit growing, poultry management &c.

CENTRAL EXPERIMENTAL FARM.

The following is a summary of the letters received and sent out at the Central Experimental Farm from November 30, 1901 to November 30, 1902, also the number of reports, bulletins and circulars forwarded by mail during the same period.

	Letters received.	Letters sent.
Director.....	47,998	19,534
Agriculturist.....	3,251	2,815
Horticulturist	1,199	1,233
Chemist.....	1,163	1,147
Entomologist and Botanist.....	3,215	2,845
Poultry Manager	1,515	1,093
Accountant	1,100	1,128
	59,441	29,795

A large number of the letters received by the Director are applications for samples of grain or for the publications of the farms, a considerable proportion of which are answered



SAMPLE HEDGES, CENTRAL EXPERIMENTAL FARM, OTTAWA.

— Photo. by O. E. Saunders.

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by sending the correspondents the material asked for accompanied by circular letters. This will explain why the number of letters received so much exceeds the number sent out.

Circular letters, including circulars sent with samples of seed grain.....	45,485
Reports and bulletins mailed.....	220,426

BRANCH EXPERIMENTAL FARMS.

The correspondence with the Superintendents of the branch experimental farms is also large as is shown by the following figures :

	Letters received.	Letters sent.
Experimental Farm Nappan, N.S.....	1,616	1,336
Experimental Farm Brandon, Man.....	4,464	2,969
Experimental Farm Indian Head, N.W.T.....	5,210	5,357
Experimental Farm Agassiz, B.C.....	2,586	2,464

Much additional information has also been sent out from the branch farms in printed circulars.

By adding the correspondence at the branch farms to that of the central farm we find that 73,317 letters were received and 41,921 sent out during the year.

NOTES ON A JOURNEY WESTWARD.

On July 10, 1902, I left Ottawa for my annual tour of inspection of the western experimental farms and of agricultural operations in western Canada generally. From Ottawa to Pembroke many good farms were seen. The spring grain all looked well and the earlier sorts were heading. The hay harvest had begun and many of the fields gave promise of heavy returns. In the neighbourhood of Renfrew there were considerable quantities of pease all looking very well. Farming has improved much in most parts of this territory during the past few years. The advanced condition of the crops gave evidence that early sowing was more generally practised and their condition as a whole showed that better methods of cultivation and treatment were being followed. Cultivation, however, was not always sufficiently thorough to keep weeds in subjection, and fields were occasionally seen where daisies and wild mustard had made considerable headway, but these were exceptional. At several points along the route patches of the bright blue flowers of the common bugloss or blue weed, *Echium vulgare*, had shot up above the level of the grain, showing that this troublesome weed had become well established in some localities in that district. This is likely to spread unless efforts are made to check it.

In some parts of New Ontario many evidences were seen of increasing settlement, new homes were being established at different points and promising crops were seen here and there. A few years will no doubt effect great changes in that part of the country.

WINNIPEG.

Arriving in Winnipeg on the 12th a day was spent in inspecting the park system of that enterprising city, and considering the difficulties under which this work is conducted, the advancement which has been made is highly creditable. Eight parks in all have been established in different parts of the city, varying in size from three to ten acres each, including forty-three acres in all. These breathing spots for the people are greatly appreciated. They have been nicely laid out, and are being planted with trees

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and shrubs and decorated with borders and beds of perennial and annual flowers, and thus made very attractive. Under the energetic management of the superintendent of parks, the planting of these parks as well as that of the boulevards along many of the city streets making rapid progress. The more general use of the American elm in the street planting at Winnipeg is to be highly commended. These trees are obtained by transplanting native specimens found growing along the banks of the Red and Assiniboine Rivers.

EXPERIMENTAL FARM, BRANDON.

The experimental farm at Brandon was reached on July 15. The farm had been much injured and the work disarranged by the flood which followed a remarkable 'cloud burst' on June 1, when over 4 inches of rain fell in forty minutes, and the rainfall of that day was $5\frac{1}{2}$ inches. This unprecedented rain storm had flooded about 300 acres of land, but over the larger part of this area the flooding was not long continued. There were, however, about 62 acres of crop destroyed, including 12 acres of rotation plots and most of the uniform trial plots of pease. The plots of barley were also so much injured that no satisfactory comparisons of the yield of varieties could be made this season. Individual plots in the series of oats and wheat were also injured, and the value of this useful work at Brandon for 1902 interfered with. The additional crops destroyed were chiefly oats which had been sown for feed purposes. The other experimental plots and fields had been but slightly injured and these crops were looking well. The plantations of ornamental trees were not much damaged, and the orchards of cross-bred and seedling crab-apples being mostly on higher land had suffered but little and many of the trees were well laden with fruit. Under the energetic direction of the Superintendent, the injury caused by the flood was rapidly repaired, and at the time of my return to Brandon from the Pacific coast on September 1 the farm had almost resumed its usual appearance and everything was again in excellent order. The crops of grain harvested were above the average and the yield of hay was good, ranging from 2 to $2\frac{1}{2}$ tons per acre.

VISIT TO SEWELL.

On July 16 a drive of 22 miles was taken from Brandon to Sewell to see the swamp where supplies of native white spruce and tamarac have been obtained for planting on the experimental farm. A large area of swampy land was found, much of it covered with good specimens of these trees of various sizes. White spruce and tamarac when carefully transplanted from this locality to Brandon have done remarkably well, and it was gratifying to find so large a number of young trees available there for future planting in different parts of Manitoba.

EXPERIMENTAL FARM AT INDIAN HEAD, N.W.T.

The Indian Head experimental farm was visited on the way west on July 18-20 and again on the journey eastward, August 20-21 and 26-28. The crops were exceedingly good and the yield of grain of all sorts very heavy. Brome grass was cut and in stook and had given a very satisfactory yield. The wheat crop on the experimental farm, also that all through the Indian Head district on summer fallowed land was remarkably even and heavy, the heads being plump and well filled. A large part of the crop in the North-west Territories is on summer fallow and the proportion is increasing from year to year. The demonstrations which have been annually made on the western experimental farms during the past 15 years of the great advantage arising from the summer fallowing of land, has induced farmers generally to adopt this profitable method of treatment of the soil.

The condition of the cattle and other stock on the Indian Head farm was quite satisfactory.

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A new threshing outfit consisting of a gasoline engine and a thresher was purchased during the past season to serve the purposes of the branch experimental farms at Indian Head and Brandon. It is proposed each year to finish the threshing at one farm and then ship the engine and thresher by rail to the other. It will be a great convenience and save much loss of time to have a threshing outfit at command, as it has been very difficult for some years past to get this work done promptly. The experimental farm crops, consisting as they do of a number of varieties are more troublesome to thresh than those of the average farmer, hence it has been almost impossible to secure a thresher until towards the very end of the season.

While at Indian Head the editors of some of the leading newspapers of Great Britain, who were travelling in a party through Canada, were met, and a good opportunity given them of examining the several divisions of the work carried on at the Indian Head farm, and of travelling through portions of the Indian Head district where they were much impressed by the magnificent crops everywhere seen.

AMONG THE RANCHES.

Several days were spent among the ranches on the plains. The season has been a favourable one for stock. At Gull Lake, several large flocks of sheep were seen, at Crane Lake some large bands of pure bred Clydesdale horses and at Stair a herd of pure bred Galloway cattle numbering about 700. From Medicine Hat, Lethbridge and other points many train loads of fine beef cattle were being forwarded to Great Britain.

EXPERIMENTAL FARM, AGASSIZ.

Beginning with July 30 several days were spent at this farm. The crops were found to be generally good. Hay had yielded well and had been saved in good condition. Oats, wheat and barley were ripening fast and gave promise of satisfactory returns. Field roots and corn were making rapid growth.

STOCK.

The herd of cattle consisting of twelve animals, all Shorthorns are doing well. The pigs are of three breeds, Berkshires, Improved Large Yorkshires and Tamworths, all of which were thrifty and in good condition. The flock of Dorset Horned sheep consists of 13 females and several males, all healthy and vigorous. The fowl house is well filled with specimens of several breeds.

FRUIT.

The apple crop was scarcely an average one, but pears were yielding well and the crop of plums was good. Plum rot prevailed to a considerable extent which reduced the proportion of marketable fruit and interfered much with its keeping quality. The plums grown in the orchards on the sides of the mountain were almost or quite free from this disease.

The orchards are increasing in interest as the new varieties come into fruit. At the time of my arrival cherries were just about over, there were, however, several late sorts of which fair crops were still to be seen. The Planchoury is a fine late variety, large and of excellent quality, which was bearing abundantly and the fruit still in good condition. Plums were beginning to ripen. The Clayton was one of the earliest and was almost ripe, Peach plum and Saunders nearly ripe. These are all good early sorts. The plum and cherry trees in the valley orchards were looking well, but the apple trees in several parts of the orchard were suffering from "canker" and some trees had died from this disease. The trees on the mountain orchards are healthier than those in the valley, but even there the apple trees are not entirely free from canker.

GENERAL CROPS IN THE COAST CLIMATE OF BRITISH COLUMBIA.

The crops in the coast climate of British Columbia have been very satisfactory. The hay crop was particularly heavy. Oats and other grain also promised abundant returns, a promise which has since been fully realized.

KAMLOOPS TO VERNON.

On the return journey a two days' drive was taken across the country from Kamloops to Vernon. We proceeded first a few miles east towards Ducks, then south-west about 28 miles to Grand Prairie. All this part of the country was dry and no crops were grown without irrigation. Grand Prairie consists of about 8,000 to 10,000 acres of nearly level land, hemmed in by hills and mountain ridges with an abundant supply of water for irrigation. A large proportion of this land is under cultivation and the crops were very good. A large number of pigs are raised in this valley, which when sufficiently mature are driven to the nearest railway station and shipped to Vancouver.

Leaving this small but prosperous community the following morning, we reached Vernon in the evening. The road ran over many wooded hills and valleys where large herds of cattle found pasture. Approaching Vernon the grain crops were remarkably good. The scenery was very interesting and the drive one to be long remembered.

LORD ABERDEEN'S ORCHARD.

Five miles from Vernon we reach Coldstream, the estate of Lord Aberdeen, where there is one of the largest and best orchards in Canada. The trees number many thousand, are all well grown, and a large proportion of them were bearing fruit. The crop of apples this year was a very large one. At Coldstream there are also large plantations of plums, pears, cherries and small fruits and a very large field of hops.

CALGARY TO MACLEOD.

August 16.—Left Calgary at 7.45 a.m. for Macleod. From Calgary to Midnapore there were some crops and a few settlers, but most of the land is devoted to the grazing of horses. South of Midnapore the railway track had been submerged for some miles owing to the heavy rains. Some good fields of oats were seen near DeWinton, some of which were cut and in stook. Okotoks and High River are thriving towns on this line, many settlers have lately come into this district and a considerable area of land is under crop. South of this the country as far as Macleod is chiefly devoted to ranching.

From Macleod to Lethbridge the journey was made after dark. The district of which Lethbridge is the centre, is improving considerably, and since the new irrigation ditch has been constructed and put in operation, many new settlers have come in. The town also has improved much in appearance, the gardens are well supplied with water, and the large public square in the centre has been planted with rows of trees (Dakota cottonwood) which are growing well.

LETHBRIDGE TO MORMON SETTLEMENTS.

The Mormon settlements in this district are growing fast. A drive was taken to the town of Stirling also to Raymond. Stirling which is only three years old has now a population of 700 and the settlers have cropped 3,500 acres of land this year, about one-half of which was wheat. A considerable quantity of winter wheat is grown here. Raymond is about fifteen miles from Stirling. In my last annual report p. 84 I made some reference to this new town, which was then being founded. In September, 1902, when I first passed the site of this place, two or three tents were the only objects visible on the wide stretching prairie; but in August, 1903, after a lapse of eleven

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months, a fine town had been built with a population of 600, and between 4,000 and 5,000 acres of land were under crop. The estimate for the wheat crop at that time in that district was from twenty-five to thirty bushels per acre.

REGINA TO SASKATOON.

On returning to Regina a trip was taken up the Prince Albert railway as far as Saskatoon. This section of country is being settled very rapidly within twenty-five miles on either side of the railway. Many visitors were met with going from point to point on the railway and in vehicles inspecting and purchasing lands. Some of these were from eastern Canada, but much the larger number were from the United States. These included farmers from Michigan, North and South Dakota, Iowa, Nebraska and Missouri. Among the visitors there were also the representatives of companies of capitalists who were investing largely in lands. One of these companies bought in April last, eleven hundred thousand acres and at the time of my visit six hundred thousand acres had been sold. Another company had bought two hundred thousand acres in that part of the country, and large purchases had been made in other localities.

The number of entries for homesteads in the Dominion Land offices throughout the Territories has been very much larger than in any previous year, and the number available for settlers within convenient reach of the railways has been greatly reduced. There has been a considerable advance in the price of land and with this the demand seems to have largely increased.

REGINA TO MILESTONE AND PENSE.

A journey was also made across the country from Regina south to Milestone and thence north-west through Yellow Grass to Pense. Settlement was proceeding about as rapidly throughout this district as on the line to Saskatoon.

THE WESTERN HORTICULTURAL SOCIETY.

The return to Winnipeg was made in time to attend the meetings of the Western Horticultural Society on August 29-31, where I had the opportunity of examining a large collection of flowers, vegetables and fruits. The collections of flowers and vegetables were large and comprehensive and of excellent quality. The specimens of fruit although limited in number and variety, were for the most part very good. The principal exhibitor was Mr. A. P. Stevenson of Nelson, Man., who showed a good number of varieties of apples chiefly of Russian origin. Nelson is about six miles from Morden, Man., and Mr. Stevenson has a plantation exceptionally well sheltered, both by natural woods and artificial planting. The altitude also is low, 980 feet. A large proportion of the apples exhibited were grown on trees of Russian sorts sent to Mr. Stevenson, in 1891, from the Central Experimental Farm. Mr. Stevenson's favourable conditions enabled him to save most of the trees sent him. Larger numbers of the same varieties were sent at the same time to the experimental farms at Brandon and Indian Head, where they were planted under conditions as favourable as could then be had, but none of these have survived. It is hoped that other fruit growers will be found in the more favoured districts, who may be equally successful with Mr. Stevenson, but for the average farmer under average conditions the chance of reaching similar results is small.

The apples shown by Mr. Stevenson at the exhibition of the Western Horticultural Society included the following:—Blushed Calville, Hibernial, Stone Antonovka, Little Hat, Ostrakoff Glass, Sugar Sweet, Saccharine, Anisim, White Rubets, Krinskoe, Hare Pipka, Peerless, Simbirsk No. 9, Arabka, Cross, Simbirsk, No. 1, Grandmother, Volga Anis, Wealthy, Red Cheeked Borovinka, Yellow Transparent, Duchess and White Transparent. Among the smaller exhibitors of fruit were Mr. Thos. Frankland of

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Stonewall, Man., and Miss E. Fowler of Headingly, Man. The whole exhibit was a credit to the society and to the province.

It has been my privilege, as official duties have permitted to attend other meetings of farmers and fruit growers during the year where I have had the pleasure of addressing the meetings, and taking part in the discussions and contributing, I trust some useful information.

EXPERIMENTAL FARM, NAPPAN, N.S.

A visit was paid to this farm in October, from the 8th to 11th. Every thing was found in good condition, although most of the crops had been harvested. This farm is improving much from year to year, the area of land under cultivation has been considerably enlarged and the quality of the soil improved by manuring, and the ploughing under of pease and clover. The field roots on the newer portions of the upland were an excellent crop.

Indian corn was being harvested at the time of my visit and was yielding a fair return notwithstanding the unfavourable season.

Oats had given an unusually heavy crop, so also had wheat and barley. The hay had been well saved, the uplands having given excellent returns while the marsh land had scarcely given an average crop. The yields on the experimental farm were said to be fair indications of the crops in general throughout Nova Scotia, New Brunswick and Prince Edward Island which have been highly satisfactory.

Good progress is being made with the different sorts of stock kept on the farm and a good dairy herd has been built up. In swine, sheep and poultry some progress has also been made.

In the horticultural division, considerable advancement is noticeable. The orchard located on the main road is improving fast and most of the trees are making good growth. Many of the apple trees are bearing well and there were good crops on some of the older specimens. The smaller trees are making satisfactory increase in size but many of them are not yet old enough to bear fruit.

The orchard in the wooded inclosure is growing finely, the trees are vigorous and are developing evenly and a few of the older specimens were heavily laden with fruit, and some of the smaller trees, only four years planted, were bearing more or less. The general fruit crop in Nova Scotia was much lighter than usual and was estimated at less than half an ordinary crop.

The hedges and ornamental trees and shrubs have done well, making the lawns and grounds about the buildings very attractive. The various sorts of perennial and annual flowers grown here have furnished a succession of bloom throughout the season.

INTERNATIONAL CONFERENCE ON PLANT BREEDING.

On September 30, and October 1-2. I attended under your instruction a very important meeting in New York, held under the auspices of the Horticultural Society of that city, namely an 'International Conference on Plant Breeding and Hybridization' in company with Mr. W. T. Macoun, horticulturist and Dr. C. E. Saunders, experimentalist of the experimental farm. At this gathering we had the opportunity of meeting many eminent men engaged in these useful lines of work from different parts of the world. The sessions were most enjoyable and instructive and much information was gathered from the papers read and the discussions which followed. A paper was read by me on the 'Results of Hybridization and Plant Breeding in Canada,' illustrated by specimens, in which the work accomplished by different experimenters in Canada in this direction for the past 40 years was brought under notice. Prominence was also given to the work in plant breeding and hybridizing which has been done with cereals, fruits, &c., during the past 15 years, at the experimental farms. A paper was also presented by Mr. W. T. Macoun entitled 'Notes on the Breeding of Beans and Pease' and by Dr. C. E. Saunders, on a 'Study of the Variations in the Second Generation of Berberis

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Hybrids'. These papers served to show that much useful and important work in plant breeding and hybridizing had been done in Canada.

This meeting created a widespread interest in the subject and much good will undoubtedly result therefrom. The papers presented are being published and will be widely circulated.

DISPLAY OF CANADIAN AGRICULTURAL AND HORTICULTURAL PRODUCTS AT THE EXHIBITIONS IN ENGLAND AND IRELAND.

A fine collection of Canadian cereals and fruits was prepared at the experimental farms and shown at the exhibitions held during 1902 at Wolverhampton and Cork. Assortments of the best of the cereals were shown in the straw put up in bunches of various sizes. Samples of some of the best of the grasses grown in this country for hay and pasture were also exhibited. These were largely used to decorate the Canadian courts. Many different varieties of agricultural products were also shown in glass jars of varying sizes, arranged on suitable stands. A good assortment of the more perishable summer fruits was prepared by the horticulturist at the central farm and preserved in suitable fluids. There was also a fine display of honey from the experimental farm apiary. These products were much admired for their beauty and high quality and were the subject of much favourable comment.

HEDGES.

On plate 2 in this report a very good representation is given of a portion of the sample hedges now growing at the Central Experimental Farm. Of these hedges there are now 103 varieties under trial, and most of the trees and shrubs tested have been found suitable for the purpose. These hedges are all fifty feet in length and ten feet apart and have been planted on a uniform method. Young trees or shrubs from one to two feet high have been selected, and these have been put in a single row fifteen inches apart, and after planting they have all been cut back to a uniform height of ten to twelve inches. When they are thus pruned when planted, they need no further clipping the first season, but after that, most deciduous trees and shrubs require clipping twice a year, the first time in the latter part of June, the second in August. These hedges are much admired. Among the deciduous trees and shrubs most satisfactory for hedge purposes the following deserve special mention: The Siberian Pea-tree (*Caragana arborescens*), Alder Buckthorn (*Rhamnus frangula*), Josika's Lilac (*Syringa Josikaea*), Guelder Rose (*Viburnum opulus*), Wayfaring Tree (*Viburnum Lantana*), Thunberg's Barberry (*Berberis Thunbergii*), Amur Privet (*Ligustrum amurense*), Sharp-leaved Cotoneaster (*Cotoneaster acutifolia*), and American Larch (*Larix pendula*). Among the evergreens the following are recommended: American Arbor-vitae (*Thuja occidentalis*), Douglas Golden Arbor-vitae (*Thuja occidentalis aurea Douglasii*), Rocky Mountain Blue Spruce (*Picea pungens glauca*), White Pine (*Pinus strobus*), Norway Spruce (*Picea excelsa*) and the White Spruce (*Picea alba*).

EXPERIMENTS IN TREE PLANTING ON SABLE ISLAND.

In the report of the director for 1901 an account was given of some experiments undertaken in May of that year in the planting of trees and shrubs on Sable Island, off the coast of Nova Scotia. There were included in this test 68,755 evergreens of 25 varieties and 12,590 deciduous sorts of 79 varieties, a total of 81,345. A list of these is given in the Annual Report of the Experimental Farms for 1901.

In that report some extracts were published from letters received from the superintendent of the island showing that the planting, which was begun on May 18, was finished on June 17. In subsequent letters received in July and November, he speaks of the difficulties the trees had to contend with owing to an unfavourable season, and of their condition at its close.

REPORTS FROM SABLE ISLAND IN 1902.

The first letter received in 1902 was written May 26. In this Mr. Boutellier says : 'I will give you the latest news of the trees. Our winter has been very mild ; not much snow and not much frost. When a cold snap occurred it was followed by enough mild weather to take all the frost out of the ground. March was very mild ; April was cold and windy, and that has continued up to a week ago. Many pines that seemed to stand the winter went red in March and April, and many that turned colour have recovered and are putting out new buds. Survivors of Austrian, Mountain and Maritime pines are the most promising, and those that are now doing well are the small specimens ; nearly all the larger ones planted are killed. A few spruces of all kinds survive, but they are not promising. Of the arbor vitae only a few are living. Juniper of both kinds nearly all dead ; perhaps four or five survivors.'

'Of the Maritime pines raised from the seed you brought, these were killed wherever they were scattered on the bare ground, but where they grew up among the grass they are growing finely in this shelter, and there are thousands now green and putting out new buds. When sowing these I put them in thick, and after they came up I thought that in spots they were too thick ; but this was their salvation, as the winds subsequently killed those on the outside, while those in the middle of these bunches were protected and have remained green.'

'The deciduous trees were killed down from the top, some to the ground, others killed outright but there are no exceptions, all are killed at least half way down—Included in these are *Pyrus prunifolia*, *P. baccata*, *Caragana arborescens* and Silver Poplar. All these deciduous sorts put out leaves a month ago, but lately we have had very high winds and all the leaves are more or less blighted and some of the gooseberry and currant bushes are stripped. As I have mentioned before shelter is necessary here to success.'

'An exception I forgot. *Ampelopsis quinquefolia* which made vines three to six feet long, they laid on the ground and are alive to the tops. *Lycium Europeum* did well but it grows more upright and was partly killed. The strawberries came through well and look fine, roses with a few exceptions are growing, raspberries and blackberries killed down but are starting vigorously from the roots. After everything grows that will grow I will send you a more complete list of the casualties.'

'I kept about 10 lbs of the seed of the Maritime Pine sent last year and this I have planted this spring along with the seeds of other shrubs and trees you have sent me since, in rows in different places more or less sheltered. I also gave small lots to the three station keepers in other parts of the island. From the experience gained last year I think I shall be able to protect these seedlings next winter as well as other specimens. Shelter from the winds is the main point here. Many Manitoba maple seedlings have leaved out and although they are killed from $\frac{1}{2}$ to $\frac{3}{4}$ down they are putting up^h a vigorous growth.'

'I have moved a few lilacs and Virginia-creeper to the edge of my platform at the house where I can train them over the rail this season. I have also given a few lilacs to the other stations, to whet their appetite for this kind of thing.'

'Speaking again of the need of shelter you will remember that there were three patches planted inside the home field in which the house stands. Two of these were long narrow strips which were ploughed before planting and subsequently cultivated. Of the trees planted on these plots there is not one survivor. In the front a plantation was made of about 1,000 trees in almost pure sand in which the sand binding grass was growing. When the grass grew up I had some of it cut out with a grass hook, and intended having it all cut, but more than half of it was left. Where the grass was left the trees are nearly all alive and thrifty, where the grass was cut 90 per cent are dead. In this grass are some nice specimens of *Pinus strobus*, White Pine, which did not stand exposure at all. About 300 trees are now growing in this plantation. Of the few sample bags of seed potatoes you brought me of 3 lbs. each I raised about five bushels nearly enough seed for my planting this spring.'

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The next letter is dated September 18 in which the superintendent says 'I wrote you in the spring about the trees and I think on the whole it was encouraging. I am afraid that the facts I am to give you now will be less so. I mentioned that nearly all the deciduous trees had come through the winter, and although killed down somewhat had leaved out again and were making a promising start. The winds in the latter part of May were cruel to the trees sometimes running up to 40 miles an hour. In June we had a succession of windy days. On the 6th and 7th of that month the wind averaged for the 48 hours over 35 miles an hour and the maximum velocity was 52 miles with the thermometer ranging from 35° to 38° F. This storm stripped all the leaves of the deciduous trees and killed a large proportion of them, the rest have been struggling along feebly but at this time very few look promising. Pines have held on pretty well.'

'Strawberries lost many of their blossoms in the storm, yet we got a nice quantity of fruit off them, Buster being by far the best fruiter, but this may have been due to the protection of a fence. A few shoots sprung up again from the blackberries and raspberries which I am now protecting.'

'The Virginia creeper, matrimony vine and lilacs which I moved to the front of my house have lived, but have not made much growth, for as soon as buds and leaves would start they would be withered by a wind storm.'

'During July about 1,200 of the seedlings of the Maritime pine were transplanted into one of the larger plantations. I dug small clumps with one or two pines growing in each, with a hoe, and planted these irregularly about a foot apart so that if they grow they will protect each other. This work was carefully done and about 75 per cent are living. The seedlings in the bed look well, as do the pines planted last year that survived the winter. These are all protected by grass and may have grown hardier by the time they get above it. The remaining pines in the plantation in front of my house held their own during the summer. I left the grass around these also.'

'With reference to the use of fertilizers on the young trees, no difference could be noticed in the ground treated and untreated; the difference where any existed was where there was some natural protection from the wind. I am continuing the experiments with the pines growing on the plantation in front of my house where I shall be able to observe it if there be any difference. No fertilizer has been applied to this lot, and although the soil is pure sand, or nearly so, the pines that survived there, were quite equal in growth to any of those treated with fertilizers last year.'

'In many cases where the tops of the seedlings of *Pinus Maritima* had turned red and were apparently dead, new shoots started just above the ground. It was a surprise to me to see conifers do this, and their roots are from 6 to 9 inches long, straight down.'

The latest communication received is under date of November 5, 1902, in which the superintendent says; 'Our autumn has been an improvement on the summer and last fall. Apple trees and shrubs protected with barrels are still growing as green as can be. The pines in Gourdeau park look fine and the fall rains have improved them very much. Our summer drouth affects the trees very seriously. Of the deciduous sorts planted in the park about fifty white birches have surprised me this fall, and they and the Scotch broom are about all that can be found there. These birches are still green and where the leaves did not get above the tall grass, are yet on the trees. We have had frost, but not enough to do injury in that direction.'

'Pinks, chrysanthemums, snap dragons, petunias, asters, gladioli and roses are still blooming in a partly protected garden; of course they look a little ragged from fall winds.'

'I took from the ground about fifty bushels of potatoes, the produce of the few sample bags you brought here in 1901. They all turned out well, but I think Carman No. 1 gave the largest yield, and all are of excellent quality. Preston wheat, Early Riga wheat, Mensury barley, Ligowo oats and Bokhara clover were all sown side by side in a patch where potatoes had been raised two years. Except the clover all grew well, heads all formed well but did not fill, and the crop was cut for straw about August 15.'

A list was received of the results of the planting of the smaller lots of trees and shrubs in the nursery, where the whole of the smaller lots and ten or twelve specimens only from each of the larger lots were put out, but no details have yet come to hand as to the number of survivors among the pines, spruces and the larger lots of the deciduous sorts which were put out in the larger plantations.

List of varieties which have survived in the nursery, showing the number planted and the proportion living on July 21, 1902:—

	Planted, May, 1901.	Living, July 21, 1902.		Planted, May, 1901.	Living, July 21, 1902.
Acer platanoides Schwedleri—Schwe-			Pyrus prunifolia...	48	40
dlers Norway Maple....	10	9	" baccata	75	56
Acer tataricum—Tartarian Maple ...	10	3	Prunus pumila—Sand Cherry	19	1
Ampelopsis quinquefolia — Virginia			Prunus maritima—Beach Plum.....	13	8
Creepers.....	25	25	Rhamnus frangula—Alder Buckthorn	10	6
Aristolochia siphon—Dutchman's Pipe.	5	1	Rhus cotinus—Smoke Tree.....	25	2
Berberis vulgaris fol purpurea—Purple			Roses—		
Barberry.....	24	8	Etoile de Lyon.....	4	2
Bignonia grandiflora—Trumpet Flower	10	1	Paul Nabonnand	6	1
Caragana arborescens—Siberian Pea-			Francis Bennett.....	3	2
tree.....	25	17	Josephine Morell	5	2
Catalpa Kempferi—Japanese Catalpa.	26	23	Papa Gontier... ..	4	2
Chionanthus virginica—Fringe Tree ..	7	2	Sunset.....	4	1
Cornus alba sibirica—Siberian Dog-			Salix laurina—Laurel leaved Willow.	10	1
wood.....	27	4	Spiraea Van Houttei.....	26	8
Crataegus oxyacantha—English Haw-			Syringa Josikaea—Josika's Lilac....	29	16
thorn	17	12	" vulgaris alba—White Lilac..	27	5
Crataegus oxyacantha fl rosea plena			" v. Louis Chabot.....	3	2
—Double red-flowering English			" v. de Marly.....	13	7
Hawthorn	10	2	" v. Mad. Lemoine.....	3	1
Deutzia crenata—Crenate Deutzia ...	19	8	" v. Leon Simon	3	2
Diervilla (Weigelia) rosea	26	8	" v. Emile Lemoine.....	3	1
Elaeagnus argentea—Wolf Willow....	6	4	Ulmus Americana—American Elm..	10	10
" multiflora.....	12	6	Viburnum Lantana—Wayfaring Tree.	27	8
Fraxinus excelsior—European Ash....	11	1	Wistaria magnifica.....	9	3
Gleditschia triacanthos—Honey Locust	10	1	Dwarf Juneberry.....	23	2
Hippophae rhamnoides—Sea Buck-			Currants, white.....	42	29
thorn	9	2	" red, cherry	29	19
Ligustrum amurense—Amur Privet..	9	7	" " Victoria.....	28	28
Lycium Europeum—Matrimony Vine.	10	10	" black, Lee's Prolific.....	36	6
Populus alba—Silver Poplar.....	10	7	Blackberry Agawam.....	8	1
" deltoides.....	10	7	" Snyder	7	1
" n. pyramidalis — Lombardy			Raspberry Sarah	13	3
Poplar	10	5	Seedling Gooseberry 10-44	6	1
Ptelea trifoliata—Wafer Ash.....	10	3	Strawberries, 12 varieties	254	254
Pyrus aucuparia—Mountain Ash.....	10	8			

PUBLICATIONS ISSUED DURING THE YEAR.

During 1902, two bulletins have been published. The first, No. 39, dealt with the 'Results obtained in 1901 from Trial Plots of Grain, Fodder Corn, Field Roots and Potatoes.' This is the seventh Bulletin of a series dealing with that subject, prepared by the Director. While dealing primarily with the results of the crops of 1901, it contains also the average results which have been had from the growing of many different sorts of cereals and other important farm crops at all the experimental farms during the past seven years. The information thus given from year to year has been very useful to Canadian farmers, for it has shown what varieties have been most productive in the different climates found within the Dominion during this long period of trial.

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The second Bulletin on 'Clover as a Fertilizer,' prepared jointly by the Director and Mr. F. T. Shutt, Chemist to the Experimental Farms, presents in a condensed and convenient form much information on the value of clover as a fertilizer when this crop is ploughed under. The enrichment of the soil by the addition of nitrogen obtained chiefly from the atmosphere, the increase in the store of available mineral plant food brought to the surface by the deep roots of the clover plant and the usefulness of the clover as a catch crop during the summer months, and in adding humus to the soil from the decay of the tops and roots, are all dwelt on. Particulars are also given of the results obtained in increased crops at the Central Experimental Farm from the ploughing under of clover during the past six years.

A very complete index has also been published of the 15 Annual Reports and 39 Bulletins which have appeared in connection with the experimental farm work during the past sixteen years. This has been compiled by the Rev. Dr. Bethune, of London, Ontario. It is a most useful and time saving document, and is so complete and well arranged that there is no difficulty in referring promptly to any subject treated of in the Reports or Bulletins and all the references are easily found. The officers of the farms who necessarily use these publications so much in connection with their work find this index invaluable.

ACKNOWLEDGMENTS.

I acknowledge gratefully my obligations to those who have rendered me special service during the past year. To the United States Department of Agriculture for much practical help, including samples of seed of cereals, fodder crops and vegetables for test from foreign countries. To the Director of the Royal Gardens, Kew, England, for seeds of many sorts of trees, shrubs and plants from different countries. To the Director of the Arnold Arboretum, Jamaica Plains, Mass., for seeds of many varieties of interesting and rare shrubs. I am also indebted to Prof. John Macoun, Naturalist of the Geological and Natural History Survey of Canada for samples of grain and seeds of trees and shrubs from the Yukon Territory, and to Mr. J. M. Macoun for seeds of rare Canadian plants.

I also tender my sincere thanks to the officers at the Central and Branch Experimental Farms for faithful services willingly rendered, and for their earnest co-operation in carrying out the work which has been planned.

Acknowledgments are also due to Dr. James Fletcher, who on several occasions during the year when official engagements necessitated my absence from home for considerable periods has assumed my duties and faithfully directed the work here, also to those members of the staff who have rendered me help in those branches of work of which I have had personal charge; to Mr. W. T. Macoun, who has supervised the labour given to the trees, shrubs and lawns on the experimental grounds; to Mr. John Fixter, the farm foreman, who has carefully watched the different branches of experimental work, has taken special charge of the tests made with fertilizers and taken notes thereon, who has also helped me much by practical suggestions; to Mr. George Fixter, who has managed the work in connection with the experimental plots of cereals, fodder crops and field roots, has taken records of the growth and yield of these, thus furnishing me with many of the particulars used in the preparation of this report, to him I am also indebted for careful management of the work connected with the distribution of samples of seed grain, and to Mr. Wm. Ellis, who has done much careful work in testing the vitality of seeds, in the management of the plants in the greenhouse and in the propagation of many useful species for out-door decoration. Mr. Ellis has also rendered useful service in the taking of the meteorological records.

I have also pleasure in bearing testimony to the faithful services of my secretary, Mr. Malcolm O'Hanley. The employees also of all the farms have my thanks for the commendable care with which they have discharged their respective duties.

WM. SAUNDERS,

Director of Experimental Farms.

REPORT OF THE AGRICULTURIST.

(J. H. GRISDALE, B. AGR.)

DR. WM. SAUNDERS,
Director, Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith reports on horse feeding, dairy herds, beef production, pork production, sheep, soil cultivation and farm crops.

Much of my time has been taken up in attending various agricultural and live stock meetings in different parts of Canada during the year.

I have to report a fairly successful year in the different branches of my division, and in this connection I wish to acknowledge my indebtedness for assistance and earnest co-operation in their various positions of the farm foreman, Mr. John Fixter, of Herdsman, Mr. C. T. Brettell, and of dairyman, Mr. J. Meilleur.

The clerical work in this division has been performed by Mr. J. F. Watson, to whom my hearty thanks are due for painstaking and interested co-operation in all correspondence and clerical work.

From December 1, 1901, to November 30, 1902, 3,251 letters were received by the agriculture division, and during the same period 2,815 letters were despatched.

I have the honour to be, sir,

Your obedient servant,

J. H. GRISDALE,
Agriculturist.

HORSES.

There are at present 17 horses in the main stables. These horses are expected to do the work in the various departments during the year. The work on the 200 acre farm is but a small part of their duties about 25 per cent. They are expected, in addition, to do each year all the work in connection with the orchards, lawns, arboretum, nurseries, forest belts and experimental plots, as well as more or less road work, grading, messenger service and hauling of mail matter.

There are maintained on the farm during the year 19 horses, which consume an average of 6,225 lbs. of meal or grain and 5,500 lbs. of hay, an aggregate of 118,275 lbs. of grain and 52 $\frac{1}{4}$ tons of mixed hay. At current prices for feed during the past year this would make a net cost of \$1,896.44 for horse feed. The average cost to feed one horse for the year was \$99.80. The average cost to feed one horse one day was 27 $\frac{1}{3}$ cents. The care of the horses cost in addition nearly 8c. per head each day, and the driver receives \$1.41 $\frac{2}{3}$ per day.

From the above data it will be seen that 10 hours work of team and driver cost during the last year \$2.12. In estimating cost of horse labour further on in this report \$2.50 per day is allowed. This leaves a margin of 38 cents per day for wear and tear on harness and for replacing horses as they grow old. Since the daily allowance of 19c. per horse amounts to \$57 in the year of 300 working days, it is evident that all possible contingencies are amply provided for.

EXPERIMENTS WITH HORSES.

The horses are fed mixed hay cut into short lengths about half an inch. The hay is moistened slightly and the grain mixed with it. The grain is ground before being mixed with the hay.

To gain some information as to the best grain mixture to feed working horses it was decided to conduct a series of experiments with different ground grain mixtures.

During the months of April, May and June, 1902, the following experiments were conducted :—

Lot 1.—Horses fed on Ground Oats and Cut Hay.

Number of Horses in.	Number of Days Fed.	Average Daily grain Ration.	Average Weight to begin.	Average Weight to end.	Total grain fed one Horse during experi-ment.	Average Loss or Gain in Weight.
7	91	Lbs. 17½	Lbs. 1,415	Lbs. 1,498	Lbs. 1,572	Lbs. 83 gain.

Lot 2.—Horses fed on Oats and Barley, equal parts, ground and Cut Hay.

3	91	18	1,438	1,538	1,636	70 gain.
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Lot 3.—Horses fed on Oats, 2 parts, Barley, 1 part, ground and Cut Hay.

3	91	17	1,389	1,441	1,548	52 gain.
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All the horses continued in good health during the experiment, and so far as could be judged any one of the grain or meal rations was as good as another.

CATTLE.

There are on the farm at present representatives of four breeds of cattle, viz.: Shorthorn, Ayrshire, Guernsey and Canadian. There are, besides, several grade animals of each kind.

PURE-BRED BREEDING CATTLE.

The pure-bred cattle are as follows :—

Shorthorns.

- 1 bull, Lord Dinsdale (imp.), 18 months old.
- 3 cows (imp.), 4, 6 and 9 years old.
- 1 cow, 13 years old.
- 2 heifers (imp.), 2 years old.
- 1 heifer (imp.), 16 months old.
- 2 heifer calves under 1 year.

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Ayrshires.

1 bull, Twin Beauty (imp.), 3½ years old.
 6 cows (imp.), 3 to 7 years old.
 1 cow, 2 years old.
 3 calves under 1 year.

Guernseys.

1 bull, Wedgewood, 8 years old.
 4 cows (imp.), 4 to 7 years old.
 1 cow, Canadian bred, 4 years old.
 5 calves under 1 year.

Canadians.

1 cow, Zamora.

DAIRY CATTLE.

The herd of dairy cattle during 1902 consisted of 26 females, all told. They were:—

MILKING STOCK.

Shorthorns	4
Ayrshires	6
Guernseys	5
Canadians	1
Shorthorn grades	4
Ayrshire grades	3
Guernsey grades	2
Canadian grades	1

FEEDING THE DAIRY CATTLE.

The roughage ration fed to the dairy cows consisted of ensilage, mangels, clover hay and some chaff. The amount of roughage fed varies considerably, since the milch cows vary in weight from 800 lbs. to 1,400 lbs. The approximate roughage ration fed per 1,000 lbs. weight is 35 lbs. corn ensilage, 20 lbs. mangels, 5 lbs. clover hay, and a little chaff.

The meal or grain ration fed consisted of different mixtures at different times and to different cows. The meals or grains used were oats, barley, bran, pease, gluten and oil meal. Gluten meal formed the basis of the ration during the winter, while oat chop took its place in summer.

No very heavy grain ration was fed to any cow. A careful study was made of each cow's requirements, and she was fed accordingly.

SUMMER FEEDING.

The cows were, as usual, pastured during the first summer months on part of the fifth year of the rotation ; that is, on land from which one year's hay had been cut. In August and September they were allowed to have part of the clover meadow aftermath of the fourth year of the rotation. In addition, some corn ensilage was fed, and some green corn. The meal ration in the summer was a light one. It consisted of oats and barley ground and fed night and morning during the milking hour. The meal was fed in proportion to the yield of milk, save in the case of heifers with first calves, when a somewhat heavier ration proportionately was fed.

COST OF FEEDING.

In estimating the cost of feeding, the following prices were charged for feed stuffs, being the average local market rates for the same period during 1902, save in the case of ensilage and roots, which are charged at the usual values affixed in experimental work :—

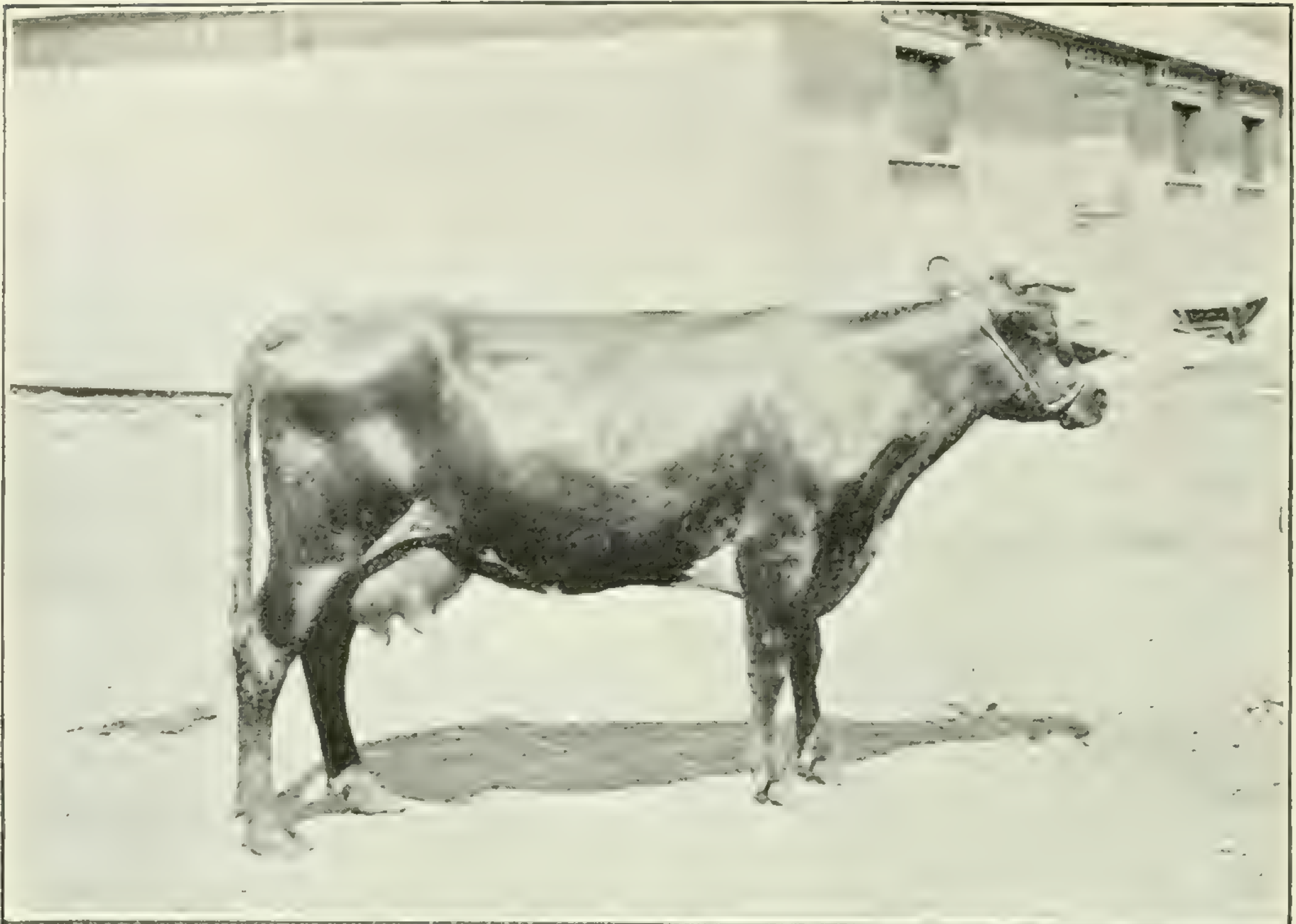
Pasture	\$ 2 00 per cow per month.
Bran	16 00 per ton.
Oats, gluten meal and barley	25 00 per ton.
Clover hay	7 00 per ton.
Chaff	4 00 per ton.
Roots and ensilage	2 00 per ton.

In estimating the value of the product, 19 cents per pound is allowed for the butter, and 15 cents per hundred pounds for the skim milk and butter milk. The butter is manufactured in the farm dairy and sells on the market at from 22 cents to 30 cents per pound, an average of about 25 cents per pound during the year. This leaves about 6 cents per pound for cost of manufacture.

The following tables give in detail the particulars concerning each cow, herd statements for each of the pure-bred and grade herds, and monthly statements for all the herds combined.

The monthly statements for the whole milking herd show the total yield of milk for each month, its butter fat content, the amount of butter produced, the number of pounds of milk required for a pound of butter, and the average yield of milk per cow per diem. The highest per cent of fat was recorded in February, and the lowest in April. The average yield of milk for the herd during the year was 7,339 lbs., which produced an average of 368·41 lbs. butter for each cow during the year.

It will be noticed that at one time and another during the year 26 cows were in milk. In taking the average, two of these were neglected because their records extend over two months only or less. They were the Canadian cow Zamora purchased from the Ursuline Sisters, of Roberval, in September, and the grade Shorthorn heifer Sadie, that dropped her first calf in September, 1902.



SHORTHORN COW : Darlington Lass. SHORTHORN HEIFERS : Duchess and Janet.



—Photos. by C. E. Saunders.

GROUP OF SHORTHORN CATTLE AT CENTRAL EXP. FARM, OTTAWA.

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MONTHLY STATEMENTS FOR WHOLE DAIRY HERD.

	December.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	Totals.
No. of cows giving milk for month ...	14	18	17	19	22	23	23	22	21	25	25	25	21
Lbs. of milk in month ...	7,650	9,281	10,259	16,238	21,229	20,980	19,287	15,320	15,017	16,323	13,271	11,282	176,137
Average for 1 day.....	247	299	366	523	701	677	643	494	484	544	428	376	482·6
Daily average per cow.....	17·6	16·6	21·5	27·5	31·9	29·4	28·0	22·4	23·0	21·7	17·1	15·4	23
Per cent fat ...	4·33	4·25	4·84	4·28	4·05	4·21	4·17	4·17	4·11	4·31	4·49	4·37	4·26
Lbs. butter fat.	331·27	395·21	496·97	695·00	860·26	882·31	804·33	639·28	617·50	703·65	597·05	492·76	7515·59
Lbs. butter....	389·72	464·95	584·67	817·64	1012·07	1038·01	946·27	752·09	726·47	827·82	702·41	579·71	8841·83
Lbs. milk for 1 lb. butter ...	19·6	19·9	17·5	19·8	20·9	20·2	20·4	20·3	20·6	19·7	18·9	19·4	19·9

The following herd reports need but little comment. Since these are the first yearly reports issued and the herds are rather uneven as to age and numbers, it would evidently be unfair to draw any inferences as to the comparative merits or demerits of the different herds.

The Canadian herd is being increased. Three more cows have been secured and will be added to the herd in January. The Shorthorn herd contains several young animals which will soon be producing.

AYRSHIRES.

Names of Cows.	Age.	Date of dropping last calf.	Number of days in milk in 1902.	Daily average yield of milk.	Lbs.	Total milk for year.	Per cent of fat in milk.	Pounds butter produced in year.	\$ cts.	\$ cts.	\$ cts.	Total value of products.	Amount meal eaten valued at 1½ cts. per lb.	Amount of roots and ensilage eaten valued at \$2 per ton	Lbs.	Lbs.	Amount hay valued at \$7 per ton.	Months on pasture at \$2 per month.	\$ cts.	Cts.	Cost to produce 100 lbs. milk.	Cts.	Cost to produce 1 lb. butter, skim milk neglected.	Cts.	Profit on 1 lb. butter, skim milk neglected.	\$ cts.	Profit on cow during year, labour neglected.
Jessie A.....	8	Feb. 12	320	34.4	11,008	3.54	458.88	87 19	15 82	103 01	1,786	13,335	626	4½	46 87	42.58	10.22	8.78	56 14								
Maggie.....	6	Mar. 25	300	29.4	8,837	3 67	393.27	74 72	12 66	87 38	1,457	10,485	626	4½	39 89	45.14	10.12	8.88	47 49								
Norah's Last	8	" 18	332	24.4	8,110	3.77	371.82	70 65	11 61	82 26	1,523	12,100	626	4½	42 33	52.18	11 39	7.61	39 93								
Denty.....	3	" 31	220	27.8	6,120	4.00	288.70	54 85	8 73	63 58	968	9,839	693	4½	33 05	54.	11.45	7.55	30 53								
Flecky.....	3	April 4	230	23.7	5,460	3.93	251.82	47 85	7 81	55 66	1,000	9,834	612	4½	33 47	61.3	13.29	5.71	22.19								
Bloomer.....	3	" 27	210	25.0	5,250	3.92	241.22	45 83	7 36	53 19	866	9,974	603	4½	31 91	60.78	13.23	5.77	21 28								
			268	28.0	7,496	3.78	334.28	63 52	10 67	74 18	37 92	50.6	11.34	7.66	36 26								

REMARKS.—Denty, Flecky and Bloomer are heifers with their first calves.

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SHORTHORNS.

Names of Cows.	Age. Yrs.	Date of dropping last calf.	Number of days in milk in 1902.	Daily average yield of milk. Lbs.	Total milk for year. Lbs.	Per cent of fat in milk. p. c.	Pounds butter pro- duced in year. Lbs.	Value of butter at 19 cts. per lb. \$ cts.	Value of skim milk at 15 cts. per 100 lbs. \$ cts.	Total value of pro- ducts. \$ cts.	Amount meal eaten valued at 1½ cts. per lb. Lbs.	Amount of roots and ensilage eaten valued at \$2 per ton Lbs.	Amount hay valued at \$7 per ton. Lbs.	Months on pasture at \$2 per month. Mos.	Total cost of feed for year. \$ cts.	Cost to produce 100 lbs. milk. Cts.	Cost to produce 1 lb. butter, skim milk neglected. Cts.	Profit on 1 lb. butter, skim milk neglect- ed. Cts.	Profit on cow during year, labour neglected. \$ cts.
Darlington Lass	9	Jan. 16	290	33.3	9,657	3.84	435.56	82 76	13 83	96 59	1,959	13,735	618	4½	49 39	51.14	11.33	7.67	47 20
Miss Molly	12	Sept. 4	280	26.5	7,430	4.71	412.35	78 35	10 58	88 88	1,850	15,400	625	4½	49 72	67.05	12.05	6.95	39.16
Marchioness	8	Jan. 18	310	27.3	8,488	4.05	404.43	76 84	12 12	88 96	1,921	13,545	618	4½	48 72	57.40	12.04	6.96	40.24
Illuminata	3	Jan. 12	300	10.8	3,266	4.12	160.69	30 53	4 66	35 19	975	8,710	542	4½	31 80	97.36	19.79	0.79	3.39
			295	24.4	7,210	4.16	353.26	67 12	10 29	77 41	...	.....	.....	.....	44 91	62.15	12.68	6.32	32.50

REMARKS.—Miss Molly dropped a roan heifer calf in September, 1902. She had not previous to that time had a calf since April, 1901. The long interval between calves was due to her having been one of the cows in the Shorthorn Dairy Herd at the Pan-American Exposition in 1901.

Illuminata dropped a red and white bull calf in January, 1902. She proved to have only two milking teats, although the udder bore four apparently perfect teats before she calved.

GUERNSEYS.

Names of cows.	Age.	Date of dropping last calf.	Yrs.	1902.	No. of days in milk in 1902.	Daily average yield of milk.	Lbs.	Total milk for year.	p. c.	Lbs.	Pounds butter produced in year.	Value of butter at 19 cents per lb.	\$ cts.	\$ cts.	Value of skim milk at 15 cts. per 100 lbs.	\$ cts.	Total value of products.	Lbs.	Amount of meal eaten. Valued at 1 1/2 cents per lb.	Lbs.	Amount roots and ensilage. Valued at \$2 per ton.	Lbs.	Amount hay eaten. Valued at \$7 per ton.	Months on pasture. Valued at \$2 per month.	Mos.	\$ cts.	Total cost feed for year.	Cts.	Cost to produce 1 lb. butter. Skim milk neglected.	Cts.	Profit on 1 lb. butter. Skim milk neglected.	\$ cts.	Profit on cow during year. Labour neglected.
Lily of Alderney		5 April 6			280	26.5	7,429		4.77	418.95		79.60		10.52	90.12	1,320	9,530	610	4 1/2	37.17	50.03	8.88	10.12	52.95									
* Clatford Spot		8 Jan. 12			310	21.1	6,529		5.30	407.06		77.34		9.19	86.53	2,110	13,940	627	1	44.40	68	10.9	8.1	42.13									
Deanie		5 July 18			320	19.0	6,061		5.13	366.01		69.54		8.54	78.08	1,456	9,835	619	4 1/2	39.21	64.7	10.98	8.02	38.87									
Ruby		5 Aug. 13			300	16.3	4,901		5.36	309.42		58.79		6.89	65.68	1,417	10,670	619	4 1/2	39.55	80.7	12.13	6.87	26.13									
Honoria		6 Sept. 18			300	19.0	5,733		4.35	293.68		55.80		8.16	63.96	1,297	10,215	612	4 1/2	37.57	65.54	12.9	6.1	26.39									
					303	20.2	6,130		4.97	359.02		68.21		8.66	76.87							11.02	7.98	37.29									

CANADIANS PURE BRED AND GRADE.

Zamora	6		80	23.3	1,866	5.10	109.94	20.89	2.62	23.51	355	2,620	90	2	11.38	61.53	10.35	8.65	12.13
Polly	7 Dec. 7		330	30.1	9,932	4.33	506.49	96.23	14.33	110.56	1,924	13,381	619	4 1/2	46.33	46.64	9.15	9.85	64.23
			205	28.7	5,899	4.44	308.22	58.56	8.48	67.04					28.86	48.93	9.36	9.64	38.18

SHORTHORN GRADES.

Bloom	8 Feb. 26		320	28.2	9,029	3.88	412.75	78.42	12.92	91.34	1,669	11,325	626	4 1/2	43.38	48.04	10.51	8.49	47.96
Rosy	3 Sept. 27		300	25.1	6,532	3.71	285.49	54.24	10.87	65.11	1,496	10,435	625	4 1/2	40.33	61.74	16.5	2.5	24.78
Cherry	2 July 15		134	22.5	3,019	4.18	144.47	21.75	4.31	26.06	511	2,355	90	4 1/2	18.07	59.85	12.5	6.5	7.99
Sadie	2 Sept. 5		80	21.2	1,698	4.01	80.33	15.27	2.42	17.69	355	2,125	90	4 1/2	15.89	93.6	19.8	.8	1.80
			208	24.4	5,060	3.89	230.76	42.42	7.63	50.05					29.42	58.03	12.7	6.3	20.63

* Remarks :—Clatford Spot met with an accident in April which materially lessened her product.

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AYRSHIRE GRADES.

Names of Cows.	Age.	Date of dropping last calf.	No. of days in milk in 1902.	Daily average yield of milk.	Lbs.	Total milk for year.	Per cent of fat in milk.	Pounds butter produced in year.	Lbs.	\$ cts.	Value of butter at 19 cents per lb.	Value of skim milk at 15 cts. per 100 lbs.	\$ cts.	Total value of products.	Lbs.	Amount of meal eaten. Valued at 14 cents per lb.	Amount roots and ensilage. Valued at \$2 per ton.	Amount hay eaten. Valued at \$7 per ton.	Lbs.	Mos.	Months on pasture. Valued at \$2 per Month.	Total cost feed for year.	Cts.	Cost to produce 100 pounds milk.	Cts.	Cost to produce 1 lb. butter. Skim milk neglected.	Cts.	Profit on 1 lb. butter. Skim milk neglected.	\$ cts.	Profit on cow during year. Labour neglected.
	Yrs	1902.					p. c.																							
Laura.....	5	Nov. 10	300	32.4	9,736		3.75	430.23	81 74		13 96		95 70		2,087	14,435	619		4½	51 69		53.09		12.02		6.98		44 07		
Countess.....	4	Feb. 16	285	30.1	8,586		4.21	425.17	80 78		12 24		93 02		1,750	13,820	626		4½	46 89		54.61		11.03		6.97		46 13		
Dora.....	10	" 24	270	29.4	7,950		3.13	292.53	55 58		11 47		67 05		1,508	11,380	555		4½	41 17		51.8		14.08		4.92		25 88		
			285	30.7	8,757		3.71	382.64	72 70		12 56		85 25		1,782	13,212	606		4½	46 58		53.19		12.19		6.81		38 67		

GUERNSEY GRADES.

Queenie.	4 Feb.	9	290	23.3	6,764	7.46	504.89	95 93	9 37	105 30	1,547	9,340	609	4½	39 81	58.85	7.88	11.12	65 49
			300	21.6	6,496	5.43	352.65	52 90	9 21	62 11	1,889	13,003	613	4½	47 76	72.3	13.55	5.45	14 35
Bellflower.			295	22.5	6,630	6.46	428.77	74 42	9 29	83 71	43 79	66.05	10.2	8.8	39 92

MILKING EXPERIMENTS.

A summary is here presented of four experiments recently conducted to gain some information as to the effect of milking cows at unequal intervals upon the quantity and quality of the milk produced.

In each case; each part of each experiment, characterized as ‘Irregular’ or ‘Regular’, lasted some 10 days or more longer than indicated in the tables. Any sudden change in the hours of milking appeared to excite some cows and affect temporarily the quantity and quality of milk yielded in the day. To avoid the possibility of such temporary variations being allowed to affect the results, about 10 days was allowed for the subsidence of any excitement due the suddenness of the change in hours of milking.

Experiment I, was conducted in the fall ; Experiment II, in the spring and Experiments III, and IV, in the summer.

The experiments appear to indicate that :—

- 1. Slight inequalities in the intervals between milkings do not affect (a) the average per cent of fat in the daily yield of milk, nor, (b) the average daily yield of milk.
- 2. Very considerable inequalities in the intervals between milkings would appear to affect slightly both the quantity and quality of the milk produced ; the quantity being reduced, and the quality somewhat inferior. The amount of butter-fat in 100 lbs. of milk seemed to be reduced by about 3½ per cent.
- 3. Very considerable inequalities in the intervals between milkings affected the amount of milk and the per cent of fat in the milk at the different milkings. The amount of milk after the long interval was much greater than that yielded after the short interval, but the percentage of butter-fat in the milk after the long period was much lower than the per cent of fat in the milk after the short interval.
- 4. On the whole, it would appear that inequalities in the intervals between milkings need arouse no anxiety as to their effect upon the quantity or quality of the product, provided no considerable sudden changes are made.

Period.	Hours of Milking.	Number of days.	Number of cows.	Average yield of milk per cow in morning.	Average yield of milk per cow in evening.	Average per cent fat in morning milk.	Average per cent fat in evening milk.	Average daily yield per cow.	Average per cent fat in milk per day per cow.	Average weight of fat per cow daily.
<i>Experiment No. 1—</i>										
Irregular.....	6 a.m. and 6 p.m.....	10	4	1 15	9·75	3·8	4·11	21·25	3·95	·8394
Regular... ..	6 a.m. and 4.30 p.m..	10	4	9·15	8·85	4·8	4·75	18·	4·78	·8604
<i>Experiment No. 2—</i>										
Irregular.....	6 a.m. and 4.30 p.m..	10	6	.....	.....	3·75	3·87	27·1	3·81	1·0005
Regular.....	6 a.m. and 6 p.m....	14	6	.....	.....	3·8	3·8	24·96	3·81	·923
<i>Experiment No. 3—</i>										
Irregular.....	6 a.m. and 4.30 p.m..	10	6	.....	.....	3·76	4·06	25·16	3·91	·826
Regular.....	6 a.m. and 6 p.m. . .	14	6	.....	.....	4·	3·98	25·15	3·99	·9796
<i>Experiment No. 4—</i>										
Irregular.....	5.30 a.m. and 1.30 p.m.	25	7	20·4	11·15	3·3	5·7	31·54	4·19	1·309
Regular.....	6 a.m. and 4.30 p.m..	20	7	19·6	12·52	3·6	4·6	32·12	4·34	1·282

DAIRY RECORDS.

The effort to interest dairymen in the returns from their individual cows has been continued, and very many farmers seem to be awakening to a knowledge of the fact that

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the improvement of the whole herd demands the study of the unit: that is, a close acquaintance with the expenditure upon the individual cow and the returns from the same.

This can be determined in no other way than by keeping an exact record of the daily milk yield and the daily food consumption.

Forms, similar to the following, for keeping a record of the milk yield are supplied free on application, as indicated on the form.

DAILY MILK RECORD.

Herd belonging to.....

Post Office.....

Record for week ending.....

(This form supplied free by Live Stock
Division, Central Experimental
Farm, Ottawa, Ont.

COWS.

Day.	Time.																Total for day.
Sunday.....	Morning.....																
	Evening.....																
Monday.....	Morning.....																
	Evening.....																
Tuesday.....	Morning.....																
	Evening.....																
Wednesday.....	Morning.....																
	Evening.....																
Thursday.....	Morning.....																
	Evening.....																
Friday.....	Morning.....																
	Evening.....																
Saturday.....	Morning.....																
	Evening.....																
Total.....	Week.....																

Remarks :

CENTRAL EXPERIMENTAL FARM.

WM. SAUNDERS, *Director.*

J. H. GRISDALE, *Live Stock and Agriculture.*

MILK RECORDS.

1. The profitable dairy cow must give over 5,000 pounds of milk each year. To know the value of a cow her total annual yield of milk must be known. The only way to know this is to keep a record of her daily milk yield.

2. The form on the other side of this sheet is intended to help progressive dairy farmers by supplying them with simple and convenient sheet for the keeping of the milk records of their individual cows. A study of such records will soon indicate which cows should go to the butche.. We would be pleased to receive a summary of your record. If you have no summary forms write us.

3. Such records are being kept by hundreds of successful dairymen so-day. Many of these men attribute their success to the keeping of such records. Why not give the thing a trial if you are a dairyman? It will increase your milk product. It will lighten your labour, since your interest will be increased in you ork and 'interest lightens labour.' It will show you the unprofitable cow the 'boarder.' You cannot get rid of her too quickly.

4. For weighing the milk a simple legal spring balance may be secured for from one to three dollars. If your local dealer cannot supply you, write the undersigned for part-

iculars. A small platform scale is fairly convenient, but we find the spring balance preferable.

5. Many farmers keep records of the amount of food fed to individual cows. If you would like to do so, sample forms would be sent free on writing J. H. Grisdale, Agriculturist, Central Experimental Farm, Ottawa, Ont.

BEEF PRODUCTION.

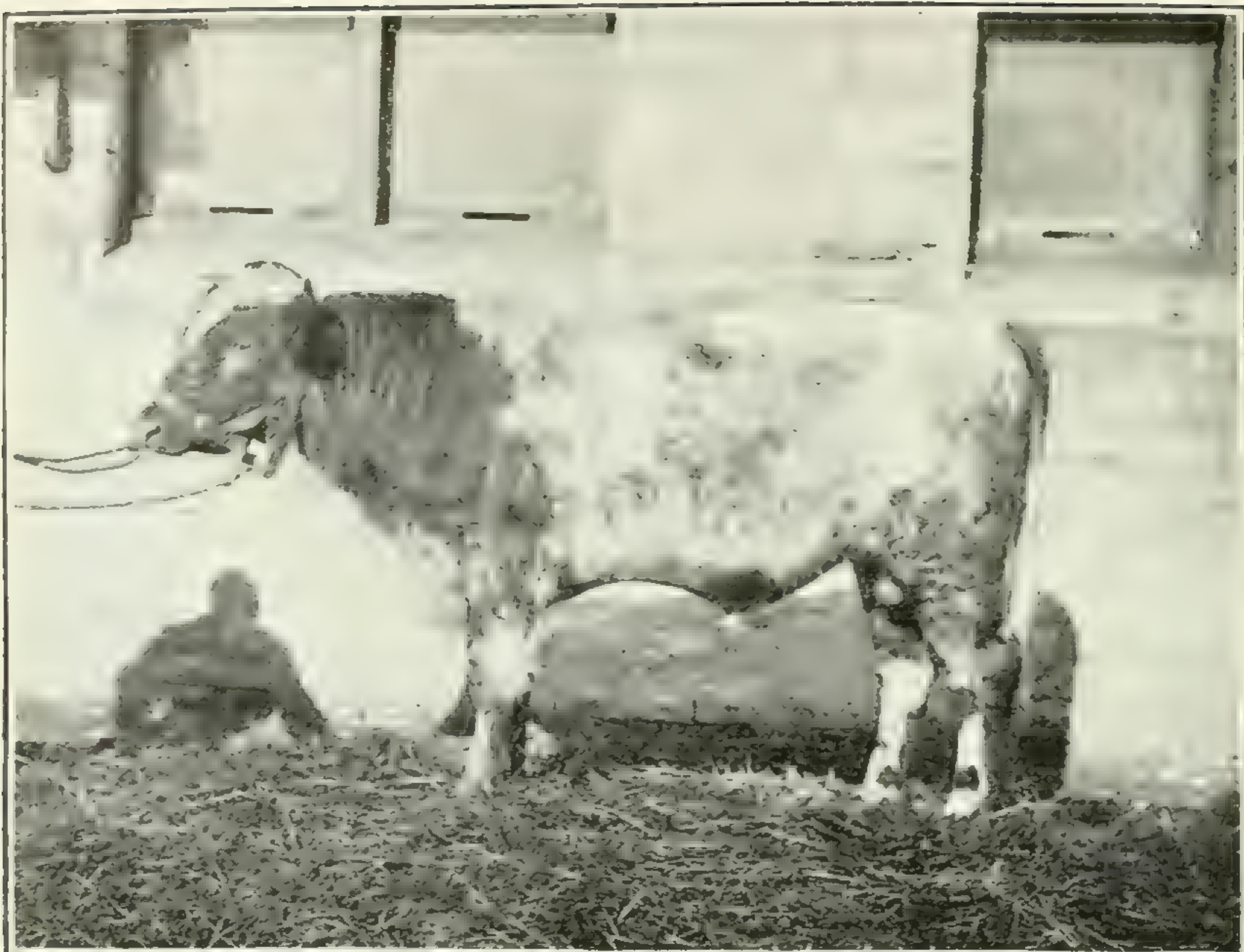
In the usual course of affairs in Canada, steers are bought in by the feeder a shorter or longer time before winter feeding begins, and fed through the season for the Easter or later spring market. It is evident, therefore, that the feeder to be successful from a financial standpoint, must also be a fairly good business man. A cent or fraction thereof per pound too low or too high may quite easily spoil all chances of a profitable operation. Supposing the autumn seller to know his business, the buyer may make a great mistake by investing in cheap feeders, much more easily than he may err in securing feeders too nearly finished, or of too high a quality for his prospective market. Examples of too good a class of cattle being fed are of, course, exceedingly rare, but such lots are met with once in a while. The great danger and the common mistake made is in securing too common a class at too high a price per pound, even though the price paid sounds ridiculously low when contrasted with quotation for good feeders or prime finished beeves. It is seldom indeed that the poor steer can be bought cheap enough to make the feeding profitable. The choice feeder, however, at a reasonable price frequently leaves a small balance as profit.

To select the good feeder requires much experience, a good eye and some courage. Experience is necessary that the buyer may know the general characteristics, the indescribable peculiarities which go to indicate the profitable feeder, which point out almost unmistakably the 'good doer', the steer with the hearty appetite, and the power to use his food profitably; that is, convert it into the right sort of meat in the right place.

A good eye is necessary that the buyer may select only such steers as have the right shape for the beef producing animal. It is easy for almost any one who knows anything about beef cattle to decide after a leisurely examination that a certain individual conforms fairly well to the requirements of the ideal steer. It is difficult for any but an expert or one with an eye well trained to see properly at a glance, (in spite of surroundings) to go into a 'bunch' of feeders and thence select such animals as are best suited for feeding purposes; because such selection must include only broad-backed, straight-topped, deep-bodied, long, deep and square quartered, wide-chested, short-necked, quiet and clear-eyed, broad and clean headed, short and rather fine limbed, soft, mossy-haired and mellow handling, medium thick skinned animals, with a fair paunch development, a good spring of rib, a rather straight underline, and a well filled twist. Such animals always feed well, and, what is equally important, always sell well.

But now comes the moment for a display of courage, in the eyes of many feeders such cattle are, if they carry any flesh at all, always fit for the butcher. Many feeders think they cannot put a sufficient weight on a steer in good condition, to pay for the feeding. In this judgment the most powerful argument is fear, fear that the steer is already fat, or fear that the choice steer next spring will not bring any more than the medium steer last spring (on which the profits were exceeding small if not minus) experience of the best feeders has shown over and over again that it is the good steer pays, and pays well. It is therefore always wise to select the good steer and feed him well. Little fear need be entertained for the outcome since for every one mistake or loss with good steers there are dozens with inferior steers.

The steer once selected and the stabling period on, the feeder must exercise great care in making all arrangements. Every comfort provided pays, and pays well; every precaution against loss on every individual steer is a guard against failure on the whole lot. If steers have been friendly during the pasture period, let them be together to feed. If feeding loose, putting one or two small or weak steers with a number of large, strong animals is a mistake. Draughts should be guarded against because they cost extra feed,



—Photos. by Frank T. Shutt.

1. SHORTHORN BULL: Lord Dinsdale.

2. SHORTHORN COW: Illuminata.

3. SHORTHORN HEIFER: Jessica Elmhurst.

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and often mean sick animals ; warm quarters should be secured ; they save much meal. Ventilation should be provided ; fresh air means health, and health means pounds of beef.

EARLY FALL FEEDING.

A period of change in feeding beef animals is a period of loss. The measure of loss in changing from pasture to stall feed is the amount of change in the quality of the ration. The more nearly the first stall ration resembles the last pasture ration, the less will be the loss. It is evident, therefore, that the first few weeks stall feeding rations should be as nearly like grass in succulence and composition as possible. Roots and clover hay come as near filling these requirements as it is possible to get. As much roots as the animal can safely eat and all the clover hay he wants will make a fairly well balanced and an entirely satisfactory ration. As the feeding period advances, straw, if so desired, may be gradually introduced into the ration and meal added. The amount of either should be small at first, and all increases or changes should be made slowly. If corn ensilage is to form the basis of the ration for feeding it should be given sparingly at first, and in full feed only when some meal is being fed.

As already stated, succulence is an imperative requirement of early winter feeding. Yet this is not all, for to ensure continued good gains and constant good health, succulence or juiciness should be the marked peculiarity of the whole season's feeding.

After 4 or 5 weeks feeding, meal may be profitably added to the roots, or ensilage and straw, or hay. The kind fed usually depends on market prices of meal and the feeder's convenience quite as much as upon the requirements of the animal. Much care should, however, be exercised in deciding what meal ration to feed. Some sorts of meal are much better suited for feeding with certain kinds of roughage than others. To illustrate, corn meal, ensilage and Timothy hay make a very bad combination which could be materially improved by the substitution of pea meal, gluten, bran, cotton seed meal, or even oat chop, for the corn meal. Of the above sorts of meal, any one of which is well suited for feeding with ensilage, a mixture of equal parts of gluten, bran and oat chop would be likely to prove the most economical meal ration. On the other hand, the addition of bran for instance to a roughage ration of roots would be a mistake, oat chop, however, or a mixture of oat, pea and barley meal is very well suited, and corn meal may be used profitably, for feeding along with turnips or mangels. The reasons for the above statements are obvious if the composition of the feed stuffs mentioned be considered. Experiments at different places and at different times, as well as the practice of many observant feeders also support the above remarks.

The amount of meal to feed each day depends upon the size of the steer, the kind of meal, the kind of roughage, and the more or less advanced stage of the fattening process. Enough meal should be fed in the early stages or in fact at any stage to keep the steer making good gains. The richer the meal in protein, the less is required at any given time, since one of the principal reasons for feeding meal is to balance the ration : that is, to make the proportion of protein to carbo-hydrates therein just right for the most rapid and most economical production of flesh. To give the best results, the grain and meal ration should be thoroughly mixed with the roots or ensilage. The hay, or at least some of it, should be fed long.

The feeding of steers loose or tied is largely a matter of convenience. The results of most careful experiments appear to be slightly in favour of feeding loose, so far as gains in weight are concerned. The care and work of feeding is, as a rule, less when steers are fed loose, but the amount of straw or other litter required is very much greater than when the steers are kept tied up. No small part of the success or failure of steer operations is due to the man who does the actual work. The skilful, careful, observant and kind feeder can bring steers out in the spring from twenty-five to seventy-five per cent better on the same amount of feed than will the careless, rough or ignorant man. It is probably wise to conclude by saying that except under exceptional circumstances no great profits over and above the cost of food, shelter and labour need be expected from steer feeding, but a home market for feed grown on the farm and all

the manure produced for use in enriching the soil are no small consideration to the progressive farmer.

EXPERIMENTS IN 1902.

The experiments in 1902 have been similar to those in 1901. The prices charged for feeds are the same as those mentioned in connection with feeding dairy cows.

It will be noticed that the profits on the different lots fed are quite high, seemingly controverting the last statement in the preceding paragraph, but the good profits made are in no small measure due to a happy combination, of circumstances viz., good feed, ensilage was exceptionally good in 1901-2, low cost of steers and very high selling price due to a scarcity of beef in the world. Such fortunate conditions seldom occur.

LOOSE vs TIED.

The feeding of steers loose as contrasted with similar steers fed tied has been continued during the past year, and the scope of the experiment slightly enlarged to include the comparison of steers fed loose, allowed a large area of floor space with similar steers fed loose, allowed a limited area of floor space.

The steers fed tied occupied 56 square feet of floor space each and another lot fed loose occupied 84 square feet floor space each.

Both lots fed loose made greater daily gains than did the lots fed tied, while the loose lot with the smaller floor area made a considerably greater daily gain than did either of the other lots.

To summarize :—

Lot 1. Tied, 56 sq. ft. per steer, gained in all 2,760 lbs. or 307 lbs. per steer, or 1·65 lbs. per steer per day.									
Lot 2. Loose, 84 sq. ft. " "	2,961	"	329	"	1·77	"	"	"	"
Lot 3. Loose, 38 sq. ft. " "	3,109	"	345	"	1·86	"	"	"	"

The very considerable difference of 38 lbs. per steer in favour of close quarters for feeding is rather noticeable and if subsequent experiments support this finding, will be worthy of attention in such a climate as ours, where shelter is rather costly and absolutely necessary.

NOT DEHORNED, TIED (3 YEARS OLD).

Each steer occupied 56 sq. ft. floor space

Number of steers in lot.....	9	
First weight gross.....	11,610	lbs.
First weight average.....	1,290	"
Finished weight gross.....	14,370	"
Finished weight average.....	1,597	"
Total gain in 186 days.....	2,760	"
Average gain per steer.....	307	"
Daily gain for lot, 9 steers.....	14·8	
Daily gain per steer.....	1·65	
	\$	cts.
Gross cost of feed.....	171	75
Cost of 100 lbs. gain.....	6	22
Cost of steers 11,610 lbs. at 450 per 100 lbs.....	522	45
Total cost to produce beef \$522·45 x 171·75.....	694	26
Sold 14,370 lbs. at 6·17½ per 100 lbs. less 5 per cent.....	842	98
Profit on lot.....	148	78
Net profit per steer.....	16	53
Average buying price per steer.....	58	05
Average selling price per steer.....	93	66
Average increase in value.....	35	61
Average cost of feed per steer.....	19	08

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Amount of meal eaten by 9 steers.....	4,783 lbs.
“ ensilage and roots eaten.....	84,960 “
“ hay.....	6,516 “

DEHORNED LOOSE (3 YEARS OLD).

Each steer allowed 84 sq. ft. floor space.

Number of steers in lot.....	9
First weight gross....	11,844 lbs.
First weight average.....	1,316 “
Finished weight gross.....	14,805 “
Finished weight average.....	1,645 “
Total gain in 186 days.....	2,961 “
Average gain per steer.....	329 “
Daily gain for lot.....	15.92
Daily gain per steer.....	1.77
	\$ cts.
Gross cost of feed.....	178 34
Cost of 100 lbs. gain.....	6 02
Cost of steers, 11,844 lbs. at 4.50 per 100 lbs.....	532 98
Cost to produce beef 532.98 + 178.34.....	711 32
Sold 14,805 lbs. beef at 6.17½ per 100 lbs., less 5 per cent ..	868 50
Profit on lot.....	157 18
Net profit per steer.....	17 46
Average buying price per steer.....	59 22
Average selling price per steer.....	96 50
Average increase in value.....	37 28
Average cost of feed per steer.....	19 82
Amount of meal eaten by 9 steers.....	5,062½ lbs.
“ ensilage and roots.....	88,065 “
“ hay.....	6,516 “

DEHORNED LOOSE (3 YEARS OLD).

Each steer allowed 38 sq. ft. floor space.

Number of steers in lot.....	9
First weight gross.....	10,611 lbs.
First weight average.....	1,179 “
Finished weight gross.....	13,720 “
Finished weight average.....	1,523 “
Total gain in 186 days.....	3,109 “
Average gain per steer.....	345 “
Daily gain for lot of 9 steers.....	16.72
Daily gain per steer.....	1.86
	\$ cts.
Gross cost of feed.....	168 34
Cost of 100 lbs. gain.....	5 41
Cost of steers, 10,611 lbs. at \$1.50 per 100 lbs.....	477 50
Total cost to produce beef, 477.50 + 168.34.....	645 84
Sold 13,720 at 6.17½ per 100 lbs., less 5 per cent.....	804 85
Profit on lot.....	159 01
Net profit per steer.....	17 67
Average cost price per steer.....	53 05

	\$	cts.
Average selling price per steer.....	89	43
Average increase in value.....	36	38
Average cost of feed per steer.....	18	71
Amount of meal eaten by 9 steers.....	4,536	lbs.
“ ensilage and roots.....	84,645	“
“ hay.....	6,516	“

INFLUENCE OF AGE ON COST OF BEEF.

COST OF PRODUCING BEEF WITH

Three Year Olds, Two Year Olds, Yearlings, Calves.

The experiment in beef production to determine the comparative cost of beef produced by feeding steers of different ages has been continued.

Full statements of the particulars in connection with each lot will be found below. A few of the more important particulars are grouped for comparison as follows :—

Ages.	Daily gain.	Gain in 186 days.	Cost 100 lbs. gain.	Profit per steer.
	Lbs.	Lbs.	\$	\$
Three Year Olds.. .. .	1·65	307	6·22	16·53
Two Year Olds.....	1·67	311	5·70	20·50
Yearlings... ..	1·85	345	4·65	26·07
Calves.	2·14	398	3·60	14·11

In daily gain and cost of production there is a quite remarkable gradation in favour of the younger classes. The apparent change in ‘profits per steer’ column was due to the lower price available for the smaller animals when for sale.

THREE YEAR OLDS.

Number of steers in lot.....	9
First weight gross.....	11,610 lbs.
First weight average.....	1,290 “
Finished weight gross.....	14,370 “
Finished weight average.....	1,597 “
Total gain in 186 days.....	2,760 “
Average gain per steer.....	307 “
Daily gain for lot 9 steers.....	14·8
Daily gain per steer.....	1·65
	\$ cts.
Gross cost of feed.....	171 75
Cost of 100 lbs. gain.....	6 22
Cost of steers, 11,610 lbs. at \$4.50 per 100 lbs.....	522 45
Total cost to produce beef, \$522.45 + \$171.75.....	694 20
Sold 14,370 lbs. at 6·17½ per 100 lbs., less, 5 per cent.....	842 98
Profit on lot.....	148 78
Net profit per steer.....	16 53
Average buying price per steer.....	58 05
Average selling price per steer.....	93 66
Average increase in value.....	35 61
Average cost of feed per steer.....	19 08

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Amount of meal eaten by 9 steers.....	4,783 lbs.
Amount of ensilage and roots.....	84,960 "
Amount of hay.....	6,516 "

TWO YEAR OLDS.

Number of steers in lot.....	9
First weight gross.....	9,648 lbs.
First weight average.....	1,072 "
Finished weight gross.....	12,445 "
Finished weight average.....	1,383 "
Total gain in 186 days.....	2,799 "
Average gain per steer.....	311 "
Daily gain for lot, 9 steers.....	15 "
Daily gain per steer.....	1.67
	\$ cts.
Gross cost of feed.....	159 66
Cost of 100 pounds gain.....	5 70
Cost of steers, 9,648 at 4.00 per 100 lbs.....	385 92
Total cost to produce beef, 385.92 + 159.61.....	545 53
Sold, 12,445 lbs. at 6.17½ per 100 lbs., less 5 per cent.....	730 06
Profit on lot.....	184 53
Net profit per steer.....	20 50
Average buying price per steer.....	42 88
Average selling price per steer.....	81 12
Average increase in value.....	38 24
Average cost of feed per steer.....	17 74
Amount of meal eaten by lot of 9 steers.....	4,221 lbs.
Amount of ensilage and roots.....	79,898 "
Amount of hay.....	6,516 "

YEARLINGS.

Number of steers in lot.....	9
First weight gross.....	8,577 lbs.
First weight average.....	953 "
Finished weight gross.....	11,680 "
Finished weight average.....	1,298 "
Total gain in 186 days.....	3,103 "
Average gain per steer.....	345 "
Daily gain for lot, 9 steers.....	16.68
Daily gain per steer.....	1.85
	\$ cts.
Gross cost of feed.....	144 49
Cost of 100 lbs. gain.....	4 65
Cost of steers, 8,577 lbs. at \$4 per 100 lbs.....	342 08
Total cost to produce beef, 342.08 + 144.49.....	486 57
Sold 11,680 lbs, at 6.17½ per 100 lbs., less 5 per cent.....	721 24
Profit on lot.....	234 67
Net profit per steer.....	26 07
Average cost price per steer.....	38 01
Average selling price per steer.....	80 14
Average increase in value.....	42 13
Average cost of feed per steer.....	16 06
Amount of meal eaten by lot of 9 steers.....	3,537 lbs.
Amount of ensilage and roots.....	73,297 "
Amount of hay.....	6,516 "

CALVES.

Number of steers in lot.....	5
First weight gross.....	2,275 lbs.
First weight average.....	455 "
Finished weight gross.....	4,200 "
Finished weight average.....	840 "
Total gain in 180 days.....	1,925 "
Average gain per steer.....	385 "
Daily gain for lot.....	10.70
Daily gain per steer.....	2.14
	\$ cts.
Gross cost of feed.....	69 26
Cost of 100 lbs. gain.....	3 60
Cost of steers, 2,275 lbs. at \$3.50 per 100 lbs.....	79 63
Cost to produce beef, \$69.26 + \$79.63.....	148 89
Sold 4,200 lbs., \$5.50 per 100 lbs., less 5 per cent.....	219 45
Profit on lot.....	70 56
Net profit per steer.....	14 11
Average cost price per steer.....	15 93
Average selling price per steer.....	43 89
Average increase in value.....	27 96
Average cost of feed per steer.....	13 85
Amount of meal eaten by 5 steers.....	3,620 lbs.
Amount of ensilage and roots.....	20,060 "
Amount of hay.....	1,200 "

HEAVY *versus* LIGHT FEEDING.

The experiments in feeding lots of steers a heavy ration from birth to block in comparison with similar lots fed a light ration till a few months before it is desired to slaughter them are being continued.

The first lots were selected in the spring of 1900. The heavily fed lot of the first selection were ready for slaughter in March, 1902, at 22 months old. The lightly fed lot of the same selection are being fed off at present and it is expected that they will be ready for the block in March or April, 1903.

In 1901 another selection was made. The following statements give the particulars of these two lots for 1902.

YEARLINGS—HEAVY FEEDING.

Number of steers in lot.....	5
First weight gross, December 1, 1901.....	2,215 lbs.
First weight average, December 1, 1901.....	455 "
Final weight gross, December 1, 1902.....	5,420 "
Final weight, average, December 1, 1902.....	1,084 "
Total gain in 365 days.....	3,205 "
Average gain per steer.....	641 "
Daily gain for lot of 5 steers.....	8.80
Daily average gain per steer.....	1.76
	\$ cts.
Gross cost of feed.....	138 81
Cost of 100 pounds gain.....	4 33
Cost to feed 1 steer 1 day.....	7.60
Cost to feed 1 steer 1 year.....	27 76

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Amount of meal eaten by lot.....	7,216 lbs.
Amount of ensilage and roots eaten by lot.....	35,525 "
Amount of hay eaten by lot.....	2,340 "
Number of months on pasture	1 mo.

YEARLINGS—LIGHT FEEDING.

Number of steers in lot.....	5
First weight gross, December 1, 1901.....	2,026 lbs.
First weight average.....	405 "
Final weight gross.....	4,126 "
Final weight average.....	825 "
Total gain in 365 days.....	2,100 "
Average gain per steer.....	420 "
Daily gain for lot of 5 steers.....	5.75
Daily average gain per steer.....	1.15
	\$ cts.
Gross cost of feed for year.....	70 81
Cost of 100 pounds gain.....	3 37
Cost to feed 1 steer 1 day.....	3.89
Cost to feed 1 steer 1 year.....	14 16
Amount of meal eaten by lot.....	215 lbs.
Amount of ensilage and roots eaten by lot.....	31,600 "
Amount of hay eaten by lot.....	1,865 "
Number of months on pasture.....	6 mos.

In 1902, another selection was made. The following statements give the particulars of these two lots for 1902.

CALVES—HEAVY FEEDING.

Number of steers in lot.....	6
First weight gross.....	665 lbs.
First weight average.....	110 "
Final weight gross.....	2,400 "
Final weight average.....	400 "
Total gain in 200 days.....	1,735 "
Average gain per steer.....	290 "
Daily gain per lot of 6 steers.....	8.70
Daily average gain per steer.....	1.45
	\$ cts.
Gross cost of feed.....	53 37
Cost of 100 pounds gain.....	3 07
Cost to feed 1 steer 1 day.....	4.44
Amount of meal eaten by lot.....	3,316 lbs.
Amount of ensilage and roots eaten by lot.....	2,832 "
Amount of hay eaten by lot.....	679 "
Amount of skim milk eaten by lot.....	4,490 "

CALVES—LIGHT FEEDING.

Number of steers in lot.....	6
First weight gross.....	675 lbs.
First weight average.....	112 "
Final weight gross.....	2,280 "
Final weight average.....	380 "
Total gain in 200 days.....	1,605 "
Average gain per steer.....	267 "
Daily gain per lot of 6 steers.....	8 "
Daily average gain per steer.....	1.33

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	\$	cts.
Gross cost of feed for 200 days.....	47	55
Cost of 100 pounds of gain.....	2	96
Cost to feed 1 steer 1 day.....		3.96
Amount of meal eaten by lot.....	2,699	lbs.
Amount of ensilage and roots eaten by lot.....	4,706	"
Amount of hay eaten by lot.....	675	"
Amount of skim milk eaten by lot.....	4,490	"

SHEEP.

There are at present two flocks of sheep on the Central Experimental Farm.

Shropshires :—

1 ram (imported).
14 ewes (9 imported).

Leicesters :—

1 ram.
8 ewes.

The past year has been most discouraging so far as sheep are concerned. The lamb crop was rather small to begin with, and their number was greatly reduced by goitre and worms.

In addition to the pure bred, a few grade sheep are kept. These are bred to the Shropshire or Leicester ram and their young fed off as lambs.

SWINE.

There are at present four herds of swine in the piggery.
They are as follows :—

Yorkshires (Large Improved) :—

2 boars (stud).
8 sows.
50 young Yorkshires (from 2 to 4 months old).

Berkshires :—

2 boars (stud).
4 sows.
13 young Berkshires (3 months old).

Tamworths :—

1 boar (stud).
4 sows.
10 young Tamworths (2 months old).

Large Blacks :

2 boars (stud).
4 sows.
11 young Large Blacks (2 months old).

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EXPERIMENTS.

A number of feeding experiments have been conducted during the past year but they are as yet unfinished.

SHALLOW CULTIVATION AND ROTATIONS.

For many years farmers in Eastern Canada were grain growers merely. Necessity forced the inception of such a system of agriculture. Habit and ignorance prolonged the practice of such farming. The wonderful strength and seemingly inexhaustible fertility of the soil made its long continuance possible. The discovery of the possibilities of the north-west and the gradual exhaustion of our fields called a halt. Hence, for some years past change has been in the air.

Live stock farming, the system making the smallest demands on soil fertility, is rapidly supplementing grain growing. Parts of nearly every farm are now much better in condition than they were a few years ago; and, further, such is nature's wonderful recuperative power, since the partial cessation of the tremendous drain of grain exportation the average crop returns for Eastern Canada have gone up very considerably. But, as every farmer knows, even live stock farming long continued means a gradual loss of fertility, unless considerable food other than that produced on the farm is fed to stock and the manure properly cared for and utilized.

This fact has led to a study of the methods for cheaply restoring lost fertility and profitably cultivating soils so that 'improved,' rather than 'impoverished,' may be the annual verdict.

It is impossible to discuss the subject exhaustively in such an article as this, but one plan of cultivation found to give good results is where the meadow or pasture is ploughed in August, the sod being turned to a depth of $3\frac{1}{2}$ or 4 inches only. Immediately after ploughing, if in a dry time, the land is rolled, then harrowed with a light harrow. It is then left untouched until grass and weeds start to grow, when it is again harrowed, care being exercised to prevent the sod being disturbed. The harrowing or cultivating process is continued at intervals (as the weed seeds germinate) until October, when by means of a (3 plough gang) double mould-board plough the surface soil to a depth of about 4 inches is put into drills about 22 inches apart and 8 to 10 inches high. This is found to be a most satisfactory preparation of the soil for corn, roots or grain. Where grain is sown, the soil is ready for seeding at a considerably earlier date than where late fall ploughing is practised.

If, along with this system of shallow cultivation, a proper rotation is adopted, most excellent results are sure to follow. As clover is the only crop which while giving a profitable harvest still serves to enrich rather than to impoverish the soil, it is evident that clover should take a prominent place in any rotation in this country. With this fact in mind, a few rotations suitable for the improving of our lands may be offered, as follows:—

(a.) 3 year rotation—1, grain; 2, clover hay; 3, pasture.

(b.) 3 year rotation—1, corn and roots; 2, grain; 3, clover hay.

(c.) 4 year rotation—1, corn, roots, potatoes or pease; 2, grain; 3, clover hay; 4, hay or pasture.

(d.) 5 year rotation—1, grain, with 10 lbs. clover seed to plough down for fertilizers; 2, corn, roots, potatoes or pease; 3, grain; 4, clover hay; 5, hay or pasture.

(e.) 5 year rotation—1, grain; 2, clover hay or pasture; 3, corn, potatoes, roots or pease; 4, grain; 5, clover hay or pasture.

(f.) 6 year rotation—1, grain; 2, clover hay or pasture; 3, corn, roots, potatoes or pease; 4, grain; 5, clover hay; 6, pasture or timothy hay.

Rotation (a) is one well suited for some remote part of a farm where it is not convenient or practicable to apply manure regularly.

Rotation (*b*) is well suited for the farm where it is desired to keep a large number of cattle, and where there is more or less broken land to serve as pasture.

Rotation (*c*) is adapted to the requirements of the average farmer and is one well suited for general farming.

Rotation (*d*) may be followed with some advantage where there is a moist climate. The use of clover for a fertilizer merely is undoubtedly profitable where climatic conditions permit of a good growth after the cover crop has been removed.

Rotation (*e*) is probably even better suited than (*d*) for the average farmer anxious to quickly put his farm in good heart and keep it in that condition. This is more especially true in sub-humid regions.

Rotation (*f*) the longest, it is seldom or ever advisable to follow, includes one year of timothy hay, which may recommend it to many farmers. The four year rotation (*c*), however, has the same peculiarity, and is for various reasons to be preferred.

In all save (*a*) it is understood that barn-yard manure is to be applied when roots or corn or potatoes are grown. Experiment has shown over and over again that frequent light applications of barnyard manure give better returns than heavy applications at longer intervals. To illustrate, it has been proven that 10 tons per acre every third year will give much better results than 20 tons per acre every sixth year. This fact would seem to indicate very strongly the adoption of a short rather than a long rotation by all who are anxious to improve their farms and get the greatest returns from manure applied.

The chief reason for surface cultivation and the adoption of such short rotations as given above is to increase the quantity of, and place properly the chief factor making for soil fertility, humus.

Dead vegetable matter exposed to moisture and warmth soon breaks down to a form called humus or black earth, the factor just mentioned. Our prairie and newly cleared soils contain immense quantities of this material. Exposure to heat and the intermixture of earthy matter serve to waste the same. Thus, repeated grain cropping with deep ploughing provide the conditions best calculated to dissipate this matter most readily and most effectively.

The functions of this common, yet easily lost, substance are varied and important. Being, as every one can prove for himself, of the nature of a sponge, it retains the moisture in a dry time, but will allow all superfluous water to rapidly and harmlessly percolate to the lower soil layers in a wet season. It holds loose, porous soils together, and so otherwise loose sands become stable and provide a good root hold for plants. It renders dense, impermeable soils open and porous, permitting the free circulation of air and water and allowing the weak rootlets to penetrate the erstwhile impenetrable space in search of food. In brief, it is the chief factor making for good physical condition in our soils. It contains much plant food, since it is really vegetable matter, and a large percentage of this food is in available forms. It aids also in the conversion of the non-available forms of the elements of fertility into available forms. Further, it retains near the surface the dissolved plant food which must otherwise have sunk into the sub-soil.

The most important sources of humus on the average farm are farm-yard manure and crop residues. Upon the proper application or use of these materials depends the future of Canadian agriculture.

Keep humus near the surface.—Where the supply of humus is limited its location becomes a very important consideration. Now, most of our crops draw the greatest part of their food from the surface soil, for, while some roots of most plants penetrate to a considerable depth, most roots of all plants are found near the surface. Plants of nearly all descriptions thrive best where the surface soil is mellow and rich in humus. The great crops produced by newly cleared fields and prairie lands exemplify this, as does also the rank growth of plants in our forests, where the subsoil is never stirred, and where the annuals and smaller perennials must depend for their nourishment upon the surface soil almost exclusively. It would, therefore, seem to be clear that available

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plant food should be near the surface of our fields and that our surface soil should be in particularly good physical condition or tilth.

How to secure these two requirements of rapid, rank and desirable plant growth must, therefore, be the first consideration of every would-be successful farmer. Experiment and long practice seem to prove that shallow cultivation and some rotation, more especially the three year or the four year in dry districts, and the five year in rainy districts are most serviceable in increasing the humus in the surface soil, and so 'improving the physical condition' which means 'increasing the productivity' of our fields.

ESTIMATING COST OF PRODUCTION.

The importance of determining cost of production of our grain and forage crops is scarcely questionable. The climatic, and soil factors must, however, always be of primary importance, and on that account all estimates must be more or less particular in their bearing rather than general.

In the estimates which are included in the following reports on the different crops, rent, manure, labour, material (seed; twine, &c.), and wear and tear are considered. The item of supervision, of considerable moment on such farms as this, has been omitted, since most farmers in Canada do much of their own work, as well as direct the labour of such men as they employ.

The digestibility of a feed is another factor which must enter materially into any consideration of its economy of production, since, as is well known, the digestibility of our feeding stuffs ranges from about 25 per cent of the dry matter to practically 100 per cent of the whole thing.

In dividing the cost of production of a grain crop between the straw and grain, however, where the digestible dry matter of the one part is so different in composition and value from that of the other, some additional standard is necessary. Since protein is that part of any ration the most expensive to supply, it was decided to make the digestible protein the basis of value. It is, of course, well understood that protein is not the only important constituent of straw. Frequently it is of very minor consideration indeed, as when used for litter, since about 29-30 of the whole dry matter is of equal or even greater value as absorbent material.

CROP ON THE 200 ACRE FARM

OATS.

Five varieties of oats were grown. They were Banner, Improved Ligowo, Tartar King, Waverley and Goldfinder. They were sown on land that had been in roots or corn the preceding year. As the land was not of uniform character, the results will not indicate the productivity of the different varieties.

The particulars of the lots sown are as follows:—

Banner.—40 acres, sown April 16, 2 bushels per acre; matured in 119 days, August 13. Yielded 2,239 bushels, 55 bush. 33 lbs. per acre. Measured bushels weighed $41\frac{1}{4}$ pounds. A second field of Banner of $5\frac{1}{2}$ acres yielded at the rate of 47 bushels 24 lbs. per acre.

Improved Ligowo.—2 acres, sown April 24, $1\frac{3}{4}$ bushels per acre; matured in 110 days, August 12. Yielded 122 bushels 9 pounds 61 bush. 4 lbs. per acre. Measured bushel weighed $40\frac{1}{2}$ pounds.

Tartar King.— $2\frac{1}{2}$ acres, sown April 24, 2 bushels per acre; matured in 109 days, August 11. Yielded 140 bushels 4 pounds, 56 bush. 2 lb. per acre. Measured bushel weighed $39\frac{1}{2}$ pounds.

16— $6\frac{1}{2}$

Waverley.— $2\frac{1}{2}$ acres, sown April 24, $1\frac{3}{4}$ bushels per acre; matured in 112 days, August 14. Yielded 145 bushels 30 pounds, 58 bush. 12 lbs. per acre. Measured bushel weighed $40\frac{1}{2}$ pounds.

Goldfinder.— $2\frac{1}{2}$ acres, sown April 24, 2 bushels per acre; matured in 124 days, August 16. Yielded 141 bushels 9 pounds, 56 bush. 17 lbs. per acre. Measured bushel weighed 40 pounds.

Cost of growing 55 acres of Oats—

Rent of land, 55 acres at \$3.....	\$165 00
Gang ploughing in autumn, 25 acres at \$1 per acre.....	25 00
Cultivating and ribbing, 4 days at \$2.50.....	10 00
Cultivating and harrowing in spring.....	45 00
$\frac{1}{5}$ manure, at the rate of 15 tons per acre, applied in root year, at \$1 per ton.....	165 00
Seed, 110 bushels at 50 cents per bushel.....	55 00
Sowing, $5\frac{1}{2}$ days at \$2.50 per day.....	13 75
Rolling, $2\frac{1}{2}$ days at \$2.50.....	6 25
Cutting with binder, $5\frac{1}{2}$ days at \$2.50.....	13 75
Use of machinery, 20 cents per acre.....	11 00
Twine, 130 pounds at 12 cents.....	15 60
Shocking, 15 days at \$1.33 $\frac{1}{3}$	19 90
Loading and unloading, 30 days at \$1.33 $\frac{1}{3}$ per day.....	40 00
Teams drawing, 11 days at \$2.50.....	27 50
Threshing 3053 bushels at $2\frac{1}{2}$ cts. per bushel.	76 32
	<hr/>
	\$ 619 07

Total yield, 3,052 bushels 23 pounds.

Average yield per acre, 55 bushels 17 lbs.

Cost to produce 1 bushel of grain.....	00 22 $\frac{1}{3}$
Cost to produce 100 pounds digestible dry matter, grain..	0 98

MIXED CROP EXPERIMENT.

Side by side on the second year of the rotation field; that is, on what had been pasture the preceding year, were sown 9 plots of 2 acres each, the aim being to get some data as to the comparative yields of crops grown as mixtures and as pure grain. The mixtures and pure grains are as follows, with the yield of the respective crops per acre:—

	Lbs.
Plot 1, pure barley, Mensury, yielded.....	4,980
Plot 2, pure oats, Banner, yielded.....	4,990
Plot 3, pure pease, Prussian Blue, yielded.....	3,610
Plot 4, pease, 1 bushel, oats, 2 bushels.....	4,764
Plot 5, oats, $1\frac{1}{2}$ bushels, barley, 1 bushel.....	4,720
Plot 6, wheat, $\frac{1}{2}$ bushel, oats, 1 bushel, pease, $\frac{3}{4}$ bushel, barley, $\frac{3}{4}$ bushel, yielded.....	4,450
Plot 7, oats, 1 bushel, pease, 1 bushel, barley, 1 bushel.....	4,365
Plot 8, wheat, $\frac{1}{2}$ bushel, barley, $\frac{3}{4}$ bushel, oats, $1\frac{1}{4}$ bushel....	4,975
Plot 9, oats, 2 bushels, pease, 1 bushel, yielded.....	4,320

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HAY.

Cost of growing 63 acres of hay—

Rent of land at \$3 per acre.....	\$ 189 00
One-fifth manure at the rate of 15 tons per acre, \$1 per ton.	189 00
Half seeded at \$1.50 per acre, 10 lbs. clover, 12 lbs. timothy.....	94 50
8 days cutting with mower at \$2.50 per day.....	20 00
7 days raking at \$1.75 per day.....	12 25
6½ days teddering at \$1.75 per day.....	11 37½
Rent of farm machinery, oil, &c.....	12 60
Cocking, loading and unloading, 59 days at \$1.33⅓.....	78 66
12 days drawing to barn at \$2.50 per day.....	30 00
4 days team on horse fork at \$2.50 per day.....	10 00
Cost to produce 63 acres of hay.....	<u>\$ 647 30</u>

Yielded per acre, 2 tons, 1,347 lbs.

Total yield, 174 tons, 1,500 lbs.

Cost to produce 1 ton, \$3.72.

Average amount of digestible dry matter in 1 ton of hay, 1,100 lbs.

Cost to produce 100 lbs. digestible dry matter.....\$ 00 34

Cost to produce 1 acre of hay..... 10 29

SECOND CROP HAY.

Cost to produce 2¼ acres—

Cutting with mower, 3½ days.....	\$ 8 75
Raking, 3½ days.....	5 25
Cocking, loading and unloading, 19½ days.....	24 33
Drawing, 4½ days.....	11 25
Use of machinery.....	4 80
Horse fork team, 1 day.....	2 50
	<u>\$ 56 88</u>

Total yield, 41 tons 1,220 lbs.

Cost to produce 1 ton, \$1.37.

TREATMENT OF NEWLY SEEDED LAND AFTER CROP HAS BEEN REMOVED.

The treatment of new meadows in the autumn after the cover crop has been harvested is a problem that has not attracted much attention because farmers generally, and wisely concede that it is necessary to leave unmolested any growth the young plants may make in the autumn. It is claimed that such treatment insures, or at least assists in insuring the safe passage of the young plants through the first winter.

It is not my aim to condemn as unnecessary this precaution, nor to detract in any way from the importance of giving the young plants every chance to winter successfully. It is interesting, however, to note that, judging by the experiment outlined below, it is frequently unwise to let a generally wise practice prevail under exceptional conditions.

During the summer of 1901, the growth of the young clover, while the cover crops still stood uncut was very strong, and at harvest time much green clover was cut and bound in with the grain. This rapid, rank growth continued after harvesting operations were completed. On a 6 acre field it was decided to try a small experiment.

The field was divided into 3 equal parts (2 acres each).

Part 1.—This field of 2 acres was left untouched. The clover plants flowered and ripened. The crop died down and formed a thick protecting coat of dead vegetable matter.

Part 2.—This field of 2 acres was pastured by sheep. It was eaten down fairly well, but not so closely as to suggest any injury to roots.

Part 3.—This field of 2 acres was cut when the clover was in full bloom and the green clover, 8 tons, put into a silo. The plants made a few inches growth after the cutting, but did not look very vigorous when the snow came.

The fields were watched carefully in the spring of 1902 to ascertain the effects of the different autumn treatments.

Part 1.—This field started out strong, bright and promising. It made a good growth and was harvested in July. The yield was 6 tons 1,680 lbs.

Part 2.—This field offered quite as well as Part 1, and gave an almost equally good harvest. The yield was 6 tons 1,500 lbs.

Part 3.—This field did not offer as well as Parts 1 and 2 in the early spring, but began to improve towards the end of May, and when harvested in July was nearly equal to the other two fields. The yield was 6 tons 965 lbs,

CORN.

Three varieties of corn were sown in areas ranging from $4\frac{3}{4}$ to 20 acres, the aggregate being $29\frac{3}{4}$ acres.

Selected Leaming.—20 acres, sown May 28, cut for ensilage September 25. Yielded 14 tons 872 lbs. per acre. Growth strong and even, well cobbed, but very late owing to season. Cobs mostly in early milk. Part of this plot suffered from frost, lessening weight per acre.

Early Mastodon.—5 acres, sown May 29, cut for ensilage October 2. Yielded 17 tons 712 lbs. per acre. Growth very strong and even, good showing for cobs and mostly well formed in early milk.

Longfellow.— $4\frac{3}{4}$ acres, sown May 30, cut for ensilage September 22. Yielded 14 tons 1,684 lbs. per acre.

Cost of growing $29\frac{3}{4}$ acres of corn—

Rent of land, at \$3 per acre.....	\$ 89 25
Cultivating and ribbing, 5 acres, 3 days at \$2.50.....	7 50
$\frac{1}{5}$ manure, at 15 tons per acre, at \$1 per ton.....	89 25
Cultivating in spring, 2 days at \$2.50.....	5 00
Ploughing in spring, $24\frac{3}{4}$ acres at \$2.....	49 50
Harrowing in spring, 3 days at \$2.50.....	7 50
Seed, 25 lbs. per acre, $734\frac{3}{4}$ lbs. at \$1 per bushel.....	13 16
Sowing, team 3 days at \$2.50 per day.....	7 50
Harrowing twice, after sowing $3\frac{1}{6}$ days.....	9 00
Hoeing, 129 days at \$1.33 $\frac{1}{3}$ per day.....	172 00
Cultivating, team, 22 days at \$2.50.....	55 00
Cultivating, single horse, 8 days at \$1.75.....	14 00
Cutting with corn harvester, 8 days.....	20 00
Loading and unloading, tramping and putting into silo, 109 $\frac{1}{2}$ days at \$1.33 $\frac{1}{3}$	146 00
Drawing with team, 21 days at \$2.50.....	52 50
Use of machinery, 20 cents per acre.....	5 95
Use of engine, fuel, ensilage cutter and engineer, for $6\frac{1}{2}$ days.....	42 25

\$ 785 36

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Yielded 446 tons of corn.

Cost of 1 ton in silo.....\$ 1 76

Average amount of digestible dry matter per ton (75 per cent digestible), 320 lbs.

Cost to produce 100 lbs. digestible dry matter.....\$ 0 55

Cost to produce 1 acre of corn ensilage..... 26 30

MANGELS.

Three varieties of mangels were grown on 6 acres of land. The seed was sown May 12, and harvesting operations began on October 21. The varieties were as follows:—

Mammoth Long Red.—2 acres. Yielded 23 tons 1,295 pounds per acre, or 47 tons 590 lbs., equal to 1,576½ bushels on the 2 acres.

Golden Tankard.—2 acres. Yielded 52 tons 980 lbs., equal to 1,749 bushels on the 2 acres.

Giant Yellow Globe.—2 acres. Yielded 56 tons 1,370 lbs., equal to 1,889½ bushels on the 2 acres.

Cost of growing 6 acres of mangels—

Rent of land, at \$3 per acre.....	\$ 18 00
Gang ploughing in autumn, 2 days 4 hours at \$2.50.....	6 00
One-fifth cost of manuring at 15 tons per acre.....	18 00
Ploughing in spring, at \$2 per acre.....	12 00
Harrowing, 4 hours at 25 cents per hour.....	1 00
Drilling, 2½ days at \$2.50 per day.....	6 25
Seed, 24 lbs. at 18 cents, \$4.32; sowing, 4½ days at \$1.33⅓, \$6.....	10 32
Thinning, 15 days at \$1.33⅓ per day.....	20 00
Hand wheel hoeing, 8 days at \$1.33⅓.....	10 67
Hoeing 12 days at 133⅓.....	16 00
Cultivating, single horse, 9 days at \$1.75.....	15 75
Pulling, topping, loading, unloading, 32 days at \$1.33⅓....	42 66
Drawing to roothouse, team, 6½ days at \$2.50.....	16 25

Cost to grow 6 acres\$ 192 90

Total yield, 156 tons 940 lbs., or 5,215⅔ bushels. Average, 26 tons 156 lbs., or 869 bushels per acre.

Cost to produce 1 ton of mangels housed.....	\$ 1 23¼
Cost to produce 1 bushel of mangels housed.....	0 03⅞
Average dry matter per ton 246 lbs.....	
Cost to produce 100 lbs. digestible dry matter*.....	0 50
Cost to produce 1 acre of mangels.....	32 15

TURNIPS.

Two varieties were grown, sown June 11, harvested October 27. Manure was applied during the winter and spring at the rate of about 15 tons per acre.

Champion Purple Top Swede.—1 acre yielded 17 tons 1,490 lbs., or 591½ bushels per acre.

Prize Purple Top Swede.—1 acre yielded 18 tons 1,190 lbs., or 619⅝ bushels per acre.

* Analyses made in Chem. Div. C. E. F., 1902 show larger percentages of dry matter than usual.

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Cost of growing 2 acres of turnips—

Rent of land at \$3 per acre.....	\$ 6 00
$\frac{1}{5}$ manure, 15 tons per acre, at \$1 per ton.....	6 00
Ploughing in spring, at \$2 per acre.....	4 00
Harrowing, 2 hours at 25c.....	0 50
Drilling, 8 hours at 25c.....	2 00
Rolling, 1 hour at 25c.....	0 25
Seed, 6 lbs. at 20c.; sowing, day at \$1.33 $\frac{1}{3}$	2 53 $\frac{1}{3}$
Hand wheel hoeing, 1 $\frac{8}{10}$ days at \$1.33 $\frac{1}{3}$	2 40
Thinning, 4 days at \$1.33 $\frac{1}{3}$	5 33
Hoeing, 3 days at \$1.33 $\frac{1}{3}$	4 00
Cultivating single horse, 2 days at \$1.75.....	3 50
Pulling, topping, loading and unloading, 10 days at \$1.33 $\frac{1}{3}$..	13 33
Drawing, 2 days at \$2.50.....	5 00

Cost to produce 2 acres\$ 54 84

Yielded, 36 tons 680 lbs., or 1,211 $\frac{1}{3}$ bushels.

Cost to produce 1 ton of turnips, housed.....	\$ 1 51
Cost to produce 1 bushel turnips, housed.....	0 04 $\frac{1}{2}$
Average digestible dry matter in 1 ton 215 lbs.....	
Cost to produce 100 lbs. digestible dry matter.....	0 70
Cost to produce 1 acre of turnips.....	27 42

SUGAR BEETS.

Two varieties were grown on $\frac{1}{2}$ -acre plots, $\frac{1}{4}$ acre of each sort being in drills; $\frac{1}{4}$ acre of each sort being on the flat as for sugar. Sown, May 12; harvested, October 27. Manure was applied during the winter and spring at the rate of about 15 tons per acre.

Danish Improved.—Yield per acre was at the rate of 17 tons 720 lbs., from the forage, and 17 tons 248 lbs., from the sugar plot, or 562 bushels and 578 bushels, respectively.

Giant Sugar Feeding Mangel.—Yield per acre was at the rate of 20 tons 1,940 lbs., from the forage, and 21 tons 560 lbs. from the sugar plot, or 699 bushels and 639 $\frac{1}{2}$ bushels, respectively.

Cost of growing 1 acre of sugar beets—

Rent of land at \$3 per acre.....	\$ 3 00
Gang ploughing in autumn, 4 hours at 25c.....	1 00
$\frac{1}{5}$ manure at 15 tons per acre, \$1 per ton.....	3 00
Ploughing in spring at \$2 per acre.....	2 00
Harrowing in spring.....	0 40
Drilling in spring.....	0 75
Rolling in spring.....	0 16
Seed, 12 lbs. at 20c.....	2 40
Sowing, 5 hours at \$1.33 $\frac{1}{3}$	0 66
Hand wheel hoeing, 6 hours at \$1.33 $\frac{1}{3}$	0 80
Thinning, 5 days at \$1.33 $\frac{1}{3}$	6 67
Hoeing twice, 28 hours.....	3 73
Cultivating, single horse, 4 times at \$1.75 per day, 4 hours each time, 16 hours.....	2 80
Ploughing out roots, 4 hours at 25c.....	1 00
Pulling and topping, 4 days at \$1.33 $\frac{1}{3}$ per day.....	5 33
Drawing in roots, 14 hours at \$2.50 per day.....	3 50
Loading and unloading, 4 days at \$1.33 $\frac{1}{3}$	5 33

Cost to grow 1 acre.....\$ 41 53

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Average yield per acre, 19 tons 367 lbs.

Cost to produce 1 ton.....	\$ 2 17
Cost to produce 1 bushel.....	0 06½
Digestible dry matter in 1 ton 353·4 lbs.....	
Cost of 100 lbs. digestible dry matter.....	0 62

PUMPKINS.

The soil was a sandy loam and well drained. Manure was first applied at the usual rate of 15 tons per acre and worked into the soil. The plot was then ploughed and harrowed. It was marked off into 8-foot squares, and a hole about 18 inches square and six inches deep excavated at each corner. These holes were half filled with manure, a layer of earth thrown on the top and seed planted. The plants grew well and in a short time covered the whole area. A large quantity of fruit developed and grew to a fair size.

Cost of production of pumpkins—

Rent, half an acre.....	\$ 1 50
Manure, $\frac{1}{5}$ applied at the rate of 15 tons per acre.....	1 50
Extra manure in hills, 6 tons used, half the value.....	3 00
Ploughing in spring.....	1 25
Harrowing twice.....	0 18
Marking, making hills and planting.....	2 00
Hoeing.....	1 33
Cultivating, single horse.....	0 52
Hauling.....	3 75
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	\$ 15 03

Weight produced, 14,550 lbs.

Cost to produce 1 ton.....	\$ 2 06
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One ton contains about 190 lbs. digestible dry matter.

Cost to produce 100 lbs. digestible dry matter.....	\$ 1 08
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REPORT OF THE HORTICULTURIST.

(W. T. MACOUN.)

DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

December 1, 1902.

SIR,—I have the honour to submit herewith the Sixteenth Annual Report of this Division. In the following pages will be found the results of some of the most important experiments conducted during the past year, and the conclusions reached regarding others which have been carried on for a number of years.

Notwithstanding the severe frost on May 9, the season, on the whole, was satisfactory and good progress was made in the work of this division.

Character of Season.—Although the temperature did not fall as low during the winter of 1901-2 as it usually does, it was moderately cold most of the time. The winter set in on November 14, 1901, with a fall of 4 inches of snow and the ground unfrozen. It was very cold during the third week of December, the temperature falling to $14\cdot3^{\circ}$ F. below zero on the 16th, but later it was mild. January was moderately cold, on the whole, but the lowest temperature of the winter was on the 17th, when it went to 19° F. below zero. There was a very heavy snowstorm from January 21, to January 23, when 19 inches of snow fell. Another heavy snowstorm from February 1 to 3, added 15 inches more snow, which made a fine protective covering for plants and trees. February was moderately cold. It did not thaw from January 22 to February 22, but on February 25 the snow began to go rapidly, and by March 8 the sleighing was practically gone. On March 24 the frost, which had not reached a great depth during the winter, was out of the ground in many places and the soil was drying fast. Work outside was begun on April 1. On March 31, ploughing was begun in the apple orchard, the soil being in good condition and frost in a few spots only. The early spring was very fine for work, the weather being comparatively cool with little rain. Trees did not leaf out rapidly and were not much in advance of other years. It was an exceptionally favourable spring for tree planting. The winter injury to trees and shrubs was less than the average.

The most serious spring frost which has been felt in this neighbourhood for years occurred on May 9, when there were 13 degrees. This caused great destruction to early planted vegetables and badly injured herbaceous perennials and the leaves of trees and shrubs. The flowers of native plums, which were in bloom, suffered badly and the crop was much lessened; the Americana plums did not suffer as much as most of the flowers were still in bud. Cherries suffered badly where the buds were enough expanded to show white. Little injury was caused to apple blossoms. Gooseberries and currants, though in full bloom, were practically uninjured. Where strawberries had been uncovered early or had not been covered at all the injury to the flowers was very great. The grape crop was practically a failure where the vines had been uncovered, the buds being destroyed. The leaves of raspberries were badly hurt, thus weakening the plants and lessening the crop. Many herbaceous plants were injured which might be expected to stand the frost, among these being a large number of native plants. Rhubarb and asparagus, which had made considerable growth, became quite soft and useless, but grew again. Tulips and narcissus, which were in full bloom, suffered considerably, but the flowers were not destroyed. Flowering shrubs were badly hurt, a large proportion of

the flower buds being killed. *Spiræa Van Houttei*, which usually blooms profusely, had practically all the flower buds destroyed. The May flowering shrubs which noticeably escaped injury were the Tartarian Honeysuckles, Caraganas, *Spiræa arguta*, and the double flowering almond. Trees such as birch and beech did not recover from the effects of the frost till July. The flowers of the American elm were destroyed and no fruit set. There were only two days in May when the temperature was above 80° F., the highest temperature being 86° F., on the 23rd. The rainfall in May was light. June was a very showery month and growth was much retarded by cool weather. The highest temperature in June was on the 3rd, when it was 84° F. July was the warmest month of summer, but there were few really hot days. The highest temperature for the summer was 92° F., on the 8th. On July 15 there was a terrific storm of wind, rain, and hail, which blew down and broke a number of the fruit and ornamental trees at the farm, and did much damage in the surrounding country. Nearly 1½ inches of rain fell in fifteen minutes. On the 17th there was another great storm with very heavy wind and rain, which blew down and broke more trees. August was only a moderately warm month, the highest temperature being 87.5° F., on the 21st, and comparatively little rain fell during that month, nor in September, which was very fine, but not very warm. The first frost which was a killing one occurred on October 9, when 8 degrees were recorded. Everything at all tender was killed. October was a cool and frosty month, but there were no heavy rains. November was a fine month for work, the weather being comparatively mild up to November 25, when winter set in with the ground frozen. On the 26th and 27th, five inches of snow fell, and this gradually increased.

Fruit and Vegetable Crops.—The fruit crop in the provinces of Ontario and Quebec was large this year, on the whole, though in some districts it was better than in others. The apple crop was very uncertain during the early part of the season, for although the bloom was abundant, the fruit dropped much more than usual during the latter part of June and early in July. As a result of this thinning, however, the fruit grew larger, and what looked like a light crop in the early part of the season developed into a very fair one. The black spot was bad in many places and lessened the value of the crop very much, making the percentage of number one apples small. Pears, peaches, plums and cherries were all good crops in most of the districts where they can be grown successfully. Grapes did not ripen as well as usual this year. Small fruits were good. At the Central Experimental Farm the apple crop was good and the fruit clean. The plum crop was fair but the fruit smaller than usual. European plums fruited much better than usual this year. The crop of cherries was light but better than it has been since 1898. Seven rows of grape vines were uncovered before the severe frost of May 9 and the crop on these was in most cases little or nothing. The vines in the greater part of the vineyard, however, which were not uncovered at that date, produced good crops, but the autumn being cool, comparatively few kinds ripened. The crop of gooseberries and currants was good, but the injury to the raspberries in spring lessened the yield of that fruit considerably. Strawberries did well at the farm, though in the neighbourhood the crop was much lighter than usual.

Although most vegetables in the vicinity of Ottawa were badly injured and in some cases destroyed by spring frosts, few kinds suffered at the Experimental Farm, as the tender things were not put out until after the severe frost of May 9. Melons, however, were a total failure. Tomatoes, although not ripening as early as usual, were a good crop, and potatoes, which were sprayed, gave the best crop in the history of the farm.

Meetings attended and places visited.—As in the past, a portion of my time during the year was devoted to attending meetings and visiting places where I could be of service to the fruit growers, and also acquire information which would be helpful in my work here. On December 18 and 19, 1901, I attended the meeting of the Quebec Pomological Society at Coaticook, Que., and gave an address on "The Work of the Horticultural Division at the Central Experimental Farm."

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On February 21, 1902, I attended the annual meeting of the Western Horticultural Society at Winnipeg, Man., and gave a lecture on "Gardening for Profit, Including Fruit Growing," and a talk with illustrations on "What the Experimental Farms are doing for the Horticulturist." At this time I took the opportunity of visiting the Experimental Farm at Brandon, Man.

On December 13 I gave an address on 'Small Fruit and Potato Culture,' at Masson, Que., and on 'Fruit Culture,' at Casselman, Ont., later on.

At the request of Mr. G. C. Creelman, lectures were delivered before the Horticultural Societies at Cayuga, Niagara Falls South, St. Catharines, Grimsby and Hamilton, Ont., on March 10, 11, 12, 13 and 14, the subjects discussed being 'The Best Hardy Annuals and Perennials,' 'The Lawn and Garden,' and 'Fruit Growing.'

The summer meeting of the Quebec Pomological Society was held at Aylmer, Que., on August 14. This was attended and a talk given on 'Fruits for the Home Market with notes on their Culture.' On the following day the members of the society visited the Experimental Farm.

On August 19 I addressed an audience at Norway Beach, Que., and gave a practical demonstration of tree planting. This was in connection with a summer school of science which the Rev. J. A. Macfarlane is establishing there.

Between September 8 and 13 I visited the Toronto Exhibition, the Grimsby District, the Ontario Agricultural College, Guelph, the fruit farm of R. W. Shepherd, Como, Que., the Trappist Fathers, Oka, Que., and N. E. Jack, Chateauguay Basin, Que., gaining much information which will be useful to me in my work, and being of some assistance, I trust, to the fruit growers with whom I came in contact.

On September 30, October 1 and 2, I attended the Plant Breeding Conference at New York, and visited the New York Botanical Garden at Bronx Park, and during the following week visited the Arnold Arboretum, Boston, Mass., as a result of which a fine collection of trees and shrubs was kindly sent by Prof. Sargent.

Acknowledgments.—During the past year I have had much assistance from the fruit growers of Canada in many ways which has been greatly appreciated. It is a pleasure to me to know that they are in sympathy with my work. Fruit growers in the United States, especially the professors of horticulture at the agricultural experiment stations, have also shown much interest in our work and have given me great aid.

In order that the work of a department may be successfully carried on, one's associates and helpers must be men who both take an interest in the work and do it well. I am particularly fortunate in having in Mr. J. F. Watson, who attends to the correspondence and much of the other office work, and in Mr. H. Holz, foreman, men who both take an interest in their work and do it well.

Donations.—Every year, plants, scions, seeds, &c., are donated to the horticultural division. When the donor so desires, the plants sent are tested here, but not disseminated without his permission. We beg to gratefully acknowledge the receipt of the following donations during the year :—

DONATIONS.

Sender.	Donation.
Archambault, Jos. (son of Louis) St. Lin, Que	Scions, No. 2, Laurentian apple.
Arnold Arboretum, Jamaica Plain, Boston, Mass., U.S.A.	Seeds. 70 species and varieties of trees and shrubs.
Bug Death Chemical Co., St. Stephen, N.B.	50 lbs. Bug Death.
Carter, H. C., Massawippi, Q.	Scions, Shiawassee, King and Nodhead apples.
Carstesen, H. C., Billings Bridge	Scions, early native plums.
Cass, C. A., L'Orignal, Ont.	Scions, seedling apple.
Cockburn, J. P., Gravenhurst, Ont.	Scions, Stormont plum.
Dempsey, W. H., Trenton, Ont.	Scions, apple.

DONATIONS—*Concluded.*

Sender.	Donation.
Déry, F. L., St. Hilaire, Que.....	Scions, St. Hilaire and Elzear apples.
d'Orsonnens, Count, Agnès, Que	Orchids.
Dupuis, Aug., Village des Aulnaies, Q.....	Plums, fine collection.
Erwin, A. T., Ames, Ia., U.S.....	Ampelopsis Engelmanni, plants, 2.
Fowler, Miss, Headingly, Man.....	Scions, apples.
Foyeston, F., Minesing, Ont.. ..	Scions, Willie's Favourite and unknown apple.
Jack, N. E., Chateauguay Basin.....	Scions, Norman, Cox's Orange Pippin apples.
Jones, Harold, Maitland, Ont.....	Scions, Fameuse apple.
Macaulay, T. B., Montreal, Q.....	Nuts, Juglans regia.
Macoun, Prof. John, Geological Survey, Ottawa, O.	Seeds, Yukon plants.
Macoun, J. M., Geological Survey, Ottawa, Ont....	Seeds, and bulbs of Pink Erythronium.
McLean, C. F., Burton, N.B.....	Scions, Johnston apple.
Matheson, Miss J., Perth, Ont	Scions, Rufus and Fameuse apples.
Newman, C. P., Lachine Locks, Que.....	Stones, peach, 82.
Pelletier, Jos., St. Roch des Aulnaies, Q.....	Scions, Germain, St. Pierre apples.
Reynaud, G., La Trappe, Q.....	Scions, Fenouilles Gris apple.
Royal Botanic Garden, Kew, England.....	Seeds, collection.
Saunders, W. E., London, Ont.....	Plants, <i>Menispermum canadense</i> .
Shepherd, R. W., Como, Que.....	Scions, Early Joe, Matthew's Winter, and Fameuse Sucré apples.
Snow, C. H., Cumming's Bridge, O.....	Strawberry plants.
Watrous, C. L., Des Moines, Ia ..	Tree, Terry plum.
Waugh, Prof. F. A., Agricultural College, Amherst, Mass	Apples, collection.
White, Lt.-Col. Wm., Ottawa, Ont.....	Plant, variety of, <i>Lilium candidum</i> .
White, R. B., Ottawa, Ont	Plants, Herbert raspberry, Plum trees and Perennials.

I have the honour to be, sir, your obedient servant,

W. T. MACOUN,

Horticulturist.

APPLES.

The apple orchards at the Central Experimental Farm are improving in appearance every season. Many of the trees have been planted from twelve to fourteen years and are now of good size and bearing well. Few trees died from winter injury, but during the year 75 were blown down by strong winds or were so badly broken that they had to be removed. In nearly every case the trunks of the trees were rotten almost through, although the trees looked quite healthy when growing.

There were 105 apple trees planted in the orchards last spring, many of which were varieties that had not been tested before.

The trees were thoroughly sprayed, as usual, during the growing season, the early varieties four times and the late kinds five times. The trees were also washed to prevent borers from attacking them.

MICE.

Mice were very numerous and destructive to fruit trees in Eastern Ontario and the province of Quebec last winter. Little injury was done at the Experimental Farm, as the smaller trees were protected by building paper or by wooden veneer protectors. A few of the larger trees were gnawed considerably; as they were unprotected. The wooden veneer has proven very satisfactory as a preventive against mice, and is also thought to prevent sunscald to a large extent. The size of these protectors is 15 by 24 inches. They are simply wrapped loosely around the trunks and tied with twine. Those used this year were bought at \$5 per thousand. For small trees they can be

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split and two made out of one. Building paper is cheap and effective also for this purpose.

SEEDLING APPLE ORCHARDS.

Last year 494 seedlings of some of the best varieties of apples were planted, and this year 894 more were set out, making a total of 1,388 trees. Those planted this year were put in the standard orchard and are 10 by 15 feet apart. There were 54 varieties fruited in the Russian seedling orchard this season, 17 of which had not fruited before. The trees in this orchard were getting so thick that they were thinned out this season, and there are now 245 left. Few of these seedlings are of value and none of them have been found worthy of general introduction, though they may prove useful in Manitoba and the North-west. A few of the best of them have been propagated for test at the Experimental Farms at Brandon and Indian Head.

TOP GRAFTING.

The top grafting of the best winter apples on hardy stocks was continued this year, and the results will soon become interesting. Northern Spy does well here top grafted, and it is hoped that other kinds will be successfully grown also.

ORCHARD CULTURE.

The orchard culture adopted at the Experimental Farm has been described in previous reports. Briefly, the method adopted is to keep the orchard in clover for part of one year and the whole of the next, then plough and re-seed as soon as possible. The clover is cut several times during the season and left to rot on the ground. In 1898 it was found that about 25 tons of green clover were thus left to rot during the season. The clover was weighed again this year in the same orchard, and following are the results.

Two plots, each 4 by 4 feet, were taken at each cutting and the average of these is given :—

<i>Clover.</i>		Tons.	Lbs.
1st cutting, June 4, 1902, average height 16½ inches, yield per acre green clover.....	A very few flower buds beginning to show.	5	1,783
2nd cutting, June 27, average height 14 inches, yield per acre green clover.....	A moderate number of flowers in bloom.	3	721
3rd cutting, July 21, average height 13½ inches, yield per acre green clover.....		4	1,826
4th cutting, August 29, average height 13½ inches, yield per acre green clover.....		4	1,103
Total yield per acre, green clover.....		18	1,433

Although this is a less yield than that which was obtained in 1898, the clover is not noticeably less vigorous than at that time. Where the weights were taken the clover was not as good a stand as in the Russian orchard, where five cuttings were made, but the crop was not weighed there.

This system of culture is varied when thought necessary. This year, for instance, that part of the orchard planted with seedlings was kept cultivated in order to get the young trees well established.

APPLE CROP.

The crop of apples was good this year and the fruit free of scab and but slightly affected with Codling Moth. The greater part of the crop was disposed of on the Ottawa Fruit Exchange and fair prices were obtained. A small shipment was, however, made to Glasgow, Scotland, with gratifying results.

SHIPMENT OF APPLES TO GLASGOW.

On October 3, 1902, a shipment, mostly of autumn apples, was made to Glasgow in the steamer ‘*Kastalia*,’ without cold storage. The apples were packed in boxes, the inside measurement of which was : depth, 10½ inches; width, 11½ inches; length, 22 inches. The sides and top and bottom were made of three-eighth inch boards, and the ends of ½-inch, dovetailed and glued.

Apples practically free from defects of any kind were selected and packed tightly in layers. A thin layer of excelsior was placed between each layer of apples and a sheet of strong white paper on both sides of each layer of apples, which kept them perfectly clean. Enough excelsior was packed in at the sides and also at the top to keep the apples tight. Most of the fruit was packed on September 30, and kept in the cellar until the afternoon of October 1, to cool. It was then taken to Ottawa and packed in a freight car, which left for Montreal that night, and reached there the next day and was loaded on the steamer, which sailed on the morning of October 3.

Following are the account sales :

GLASGOW, October 16, 1902.

Account of sales of 100 cases of apples ex ‘*Kastalia*.’ Sold by Thomas Russell, by order and for account of W. T. Macoun, Horticulturist, Central Experimental Farm, Ottawa.

W. T. Macoun.			£	s.	d.	£	s.	d.
128	XXX	59 cases Wealthy, 6 | 9	19	18	3			
		1 " " empty.....						
	XXX	30 " McMahon, 4 | 9.....	7	2	6			
	XXX	5 " Patten's Greening, 5 | —.....	1	5	0			
	XX	5 " Fameuse, 6 | —.....	1	10	0			
		100 "	29	15	9	29	15	9
		Charges.						
		Freight on goods.....	3	8	11			
		Freight on empties, river and harbour duties, master portorage, landing, selecting, coopering, catalogues, ad- vertising, &c., cartage to warehouse, houseing, delivering.	2	10	0			
		Commission and guarantee	1	9	9	7	8	8
		Net proceeds.....				22	7	1
		"						
								\$108 41

The expenses of the shipment on this side of the Atlantic, exclusive of growing the fruit, picking, packing, and sending to the car at Ottawa, were :—

Cost of 100 boxes at Toronto	\$12 00
Freight on 100 boxes, Toronto to Ottawa.....	2 52
Freight on 100 boxes, Ottawa to Montreal.	7 74
Cost of 200 lbs. Excelsior at 3c. lb.....	6 00
	\$28 26

Leaving a net balance of..... \$80 15
or 80c. per box, or \$3.20 per barrel, taking four boxes packed as these were to a barrel.
The average profit per barrel of fall apples sold in baskets on the Ottawa Fruit



KOSLOV MORELLO CHERRY.

—Photo. by Frank T. Shutt.



WEALTHY APPLE TREES PLANTED 10 X 10 FEET APART.

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Exchange, after deducting price of baskets and commission, was about \$1.10, showing \$2.10 difference per barrel in favour of the shipment to Great Britain. Furthermore, it was found this season that as good prices could be obtained on the Exchange for good windfalls as for hand picked fruit. So that the difference in favour of the shipment to Great Britain is even greater than appears. Thos. Russell writes as follows regarding the fruit:—

‘I think these apples sold very well and I trust the result will be satisfactory to you and lead to further consignments of specially selected fruit.’

Mr. W. A. McKinnon, Chief of the Fruit Division, Commissioner's Branch, Department of Agriculture, Ottawa, who was in Glasgow at the time, inspected the fruit and reported the following:—

‘The Wealthy looked best and sold best (6/9 per case, as you probably know), and all I saw were in perfect condition. McMahon also arrived in good order, but appeared not to command the confidence of buyers, probably because new to them; the price was 4/9. Patten's Greening was in perfect condition, looked very attractive, and brought 5/ per case.

‘Viewed commercially, the shipment had only one fault, namely, that there were too few apples in the cases. The trade not only object to the Excelsior as making needless bulk, but as leaving an opening for fraud, and my observations go to confirm this opinion, that packing is quite unnecessary for nearly all varieties of apples, and that at the most a thin layer top and bottom would suffice. I liked your plan of having a sheet of paper placed between the Excelsior and the apples.

‘Viewed as exhibition stock, your shipment could not have been nearer perfection.’

It is not probable that as good results would always be obtained by shipping autumn apples in this way, but the returns show that if fruit is picked carefully and packed carefully and reaches the steamer in the proper condition, it may arrive at the other side of the Atlantic in good condition without cold storage.

A CLOSE PLANTED WEALTHY APPLE ORCHARD.

In the spring of 1896 there were in the farm nursery 144 five-year old Wealthy apple trees which had been used in an experiment. As there was a piece of land available that spring they were planted out 10 by 10 feet apart, the object being to carry on further experiments with them. Eight of these trees have died, but most of the rest are making thrifty growth, though some of the trees are affected with canker and sunscald. The soil has been kept thoroughly cultivated during the growing season every year since. During the past four years this little orchard has given very good returns, considering the size of the trees, and it promises to be still more profitable. It is doubtful if the trees will need much thinning, as a few of them die every year, letting the light and air into the rest. The soil is a cold, light, sandy loam and from 1896 up to the autumn of 1901 the only fertilizers applied were 284 lbs. of superphosphate, 54 lbs. of muriate of potash, and 132 lbs. of sulphate of ammonia, the estimated value of which was \$6.64.

In the following tables will be found the receipts and expenses for the past four years:—

		\$	cts.	\$	cts.
				Per	acre.
1899—Picked, 189 gallons, sold at 10c. a gall.....		18	90		59 15
1900— " 455 " 10c. "		45	50		142 39
1901— " 156 " 15c. "		23	40		73 23
1902— " 982 " 333 galls. at 25 $\frac{1}{2}$ ¢ (Glasgow).....		85	41	}	356 83
	530 " (second grade) sold at Ottawa,				
	6 $\frac{15}{100}$	32	55		
1899—Windfalls, 66 galls. sold at 5c. gall.....		3	30		10 33
1900— " 143 " 5c. "		7	15		22 38
1901— " 224 " 5c. "		11	20		35 05
1902— " 932 $\frac{1}{2}$ " 8 $\frac{3}{4}$ ¢ "		79	60		240 79
		307	01		940 15

EXPENSES.

1899-1901, estimated expenses per acre for three years, including rent of land, fertilizers, cultivating, spraying and marketing ..	\$148 80
1902, 45 tons per acre barnyard manure at 50c. per ton.....	22 50
Rent of land per acre.....	3 00
Cultivating and spraying per acre.....	14 43
Baskets and boxes	120 12
Picking, packing and marketing.....	145 77
Total expenses....	<u>454 62</u>
Total receipts per acre for 4 years.	\$ 940 15
Total expenses " "	<u>454 62</u>
Net receipts.....	<u>485 53</u>
Average profits per acre per year..	.\$ 121 38

There were 512½ gallons of small apples which were not sold, of which 119 gallons were among the picked fruit and 393½ gallons among the windfalls.

The reason that there is such a large proportion of windfalls is that the Wealthy apple drops badly, and this was especially the case this year. The windfalls, however, which were sold brought a better price than the second grade picked apples, and as good prices as picked fruit from other Wealthy trees. There is a great advantage in having a good local market, as the windfalls can be disposed of before they decay. The expenses are all estimated on a very liberal basis. The greatest yield of picked fruit from one tree in 1902 was 16½ gallons, and the greatest yield of windfalls and picked fruit was 34 gallons from the same tree.

It has not been possible to obtain the exact cost of this orchard prior to 1899, but including rent of land, cost of trees, planting and cultivating, the expenses per acre would be about \$150.

When such good returns can be had in a short time from Wealthy apple trees planted 10 feet apart, it is worthy of consideration. Is it not possible that it would be a good practice to have blocks of such early bearing trees of different ages and keep rooting out the older ones when they begin to fail? The development of this little orchard of Wealthy apple trees will be watched with much interest.

SEEDLING APPLES.

A larger number of seedling apples than usual were received for examination this year, which was probably due to the fact that apple trees bore well. It is gratifying to know that the originators of these fruits are desirous of getting our opinion of them, and it is hoped that still more will send in specimens. The judgment passed upon the majority of seedlings is unfavourable to them, as it is very rarely that a variety is equal or better than the best named kinds.

Most of our best commercial apples, however, are chance seedlings and other good kinds will probably originate that way. The more seedlings that are raised, the greater chances there are of getting something of superior merit.

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Full descriptions follow of the best of those received.

Record.	Province.	Address of Sender.	Description of Fruit.
219	Quebec...	C. P. Hudon, Mont St. Hilaire	Medium size, crimson; acid, medium quality; season, October.
220	Ontario...	J. I. Graham, Vandeleur.....	Below medium, greenish yellow with red blush, almost sweet.
221	"	"	See full description.
222	"	C. A. Cass, L'Orignal.....	"
223	"	"	Above medium size, deep red, sweet, medium quality; season, early winter.
224	"	J. P. Cockburn, Gravenhurst.....	See full description.
225	"	Thos. Beall, Lindsay.....	"
226	"	"	"
227	"	C. L. Stephens, Orillia.....	"
228	"	Mr. Marr, Simcoe.....	"
229	"	F. Birch, Wode House.....	"
230	"	F. G. Allerby, Galt.....	Medium, pale yellow, pink blush, mild subacid, good; season, October.
231	"	T. W. Gibbs, Bracebridge.....	Medium, pale green splashed and streaked with purplish red, subacid, quality above medium; season, early September.
232	"	J. T. Couch, Davisville.....	Medium, orange red, mild subacid, quality above medium; season, October.
233	"	W. F. Fairburn, Ottawa	Large, deep red, subacid, medium quality; season, late September.
234	"	C. Wallenshlager, New Edinburgh...	Medium, waxy yellow, subacid, quality above medium; season, early winter.
235	"	J. Ballantyne, Ottawa East	No. 1, see full description.
236	"	"	No. 4, medium, greenish yellow, pink blush, sweet, medium quality.
237	"	"	No. 5, small, pale green, subacid, quality almost good.
238	"	"	No. 6, small, yellow, acid, medium quality.
239	"	"	No. 7, below medium, yellowish green, acid, quality above medium.
240	"	"	No. 8, medium, mild subacid, quality above medium.
241	"	"	Small, splashed and washed with purplish red, subacid, medium quality.
242	Quebec...	R. Hamilton, Grenville	'Roses,' medium, splashed and streaked with orange, subacid, quality above medium.
243	"	"	'Like Talman,' medium, yellowish green, sweet, good.
244	"	"	'Gills Line,' above medium, splashed and streaked with red, sweet, medium quality.
245	"	"	'Flat Pea,' above medium, splashed with red, subacid, quality above medium.
246	"	"	'Aromatic,' medium to below, red, subacid, quality above medium.
247	"	"	'Like Spy,' see full description.
248	"	"	'Lane,' see full description.
249	"	"	'Calf Pasture,' see full description.

No. 221.—Seedling apple from J. I. Graham, Vandeleur, Ont.:—Fruit roundish conical; above medium size; cavity medium depth and width, russetted; stem broken off; basin medium depth and width, slightly wrinkled; calyx partly open; colour, greenish yellow well washed and splashed with deep red; dots moderately numerous, white, prominent; skin thick, tough; flesh yellow, moderately juicy; core large; subacid, pleasant flavour; quality good; season, probably early to mid-winter. Promising.

No. 222.—Apple from C. A. Cass, L'Orignal, Ont.:—Fruit oblate, conic, large; cavity medium depth and width; stem short, stout; basin narrow, medium depth, slightly wrinkled; calyx partly open; colour pale yellow, well splashed and washed with purplish red; dots fairly numerous, yellow, distinct; skin moderately thick, fairly tender; flesh white, slightly tinted with red, juicy, tender but a little coarse;

core medium size; subacid, pleasant flavour; quality good; season, September and perhaps later. Tree in a friend's garden. Seedling very thrifty, hardy, and a wonderful bearer, always loaded. Says they will keep nearly as long as Wealthy. A large handsome apple, which may prove an acquisition, coming between Duchess and Wealthy.

No. 224.—Seedling apple from J. P. Cockburn, Gravenhurst, Ont.:—Fruit roundish, regular; size medium to above; cavity deep, moderately open; stem short, stout; basin medium depth and width, smooth; calyx open; colour yellow, well splashed and streaked with bright purplish red; dots few, bluish, indistinct; skin moderately thick, tender; flesh yellowish, tinged with red; core rather large; briskly subacid; quality above medium; season just after Duchess. Very similar to Duchess in outward appearance, but flesh is firmer and not so tender. Core is also more open than Duchess. Said to have sprung up from root of Duchess tree.

No. 225.—Seedling apple from Thos. Beall, Lindsay, Ont.:—Fruit roundish, obtusely conical, angular, large; cavity deep, medium width; stem short, stout; basin, deep, open, smooth; calyx open; colour yellow, washed with orange and purplish red, mostly on sunny side; dots obscure; skin, moderately thick, tender; flesh yellow, tender, juicy; core medium size; subacid, rich, pleasant flavour; quality very good; season, evidently late September and early October. Tree said to be growing in Lindsay.

Bearing five or six years. This apple is quite promising and well worthy of being given a thorough test.

No. 226.—Seedling apple from Thos. Beall, Lindsay, Ont.:—Fruit oblate, somewhat angular, large; cavity deep, open; stem short or very short, moderately stout; basin medium depth and width, smooth; calyx closed; colour pale green, splashed and streaked with purplish red on sunny side; dots fairly numerous, pale, indistinct; skin thin, tender; flesh yellow, tender, melting, moderately juicy; core medium; subacid, not high flavoured; quality good; season evidently October. Tree grown fifty miles north of Lindsay. This should make an excellent cooking apple, but is not high enough in flavour to make a good dessert fruit.

No. 227.—No. 1 from C. L. Stephens, Orillia, Ont.:—Fruit roundish, conical, above medium size; cavity medium depth and width; stem medium length, stout; basin medium depth and width, almost smooth; calyx open; colour yellowish green, well splashed and washed with deep red; dots fairly numerous, pale, indistinct; skin moderately thick, moderately tough; flesh white, slightly tinged with red, tender, fairly juicy; core medium; subacid, pleasant flavour, Fameuse-like; quality good; season October probably. Evidently a seedling of Fameuse. Same season as Wealthy, no better in quality.

No. 228.—Seedling apple from Mr. Marr, Simcoe, Ont.:—Fruit roundish, very large; cavity deep, open; stem short, stout; basin deep, open, slightly wrinkled; calyx open; colour pale, greenish yellow with a bronzy pink blush; dots obscure; skin thick, moderately tender; flesh yellowish, juicy, rather coarse; core medium; subacid; quality above medium; season evidently early October. Tree said to be a seedling grown by Mr. Marr, Simcoe, Ont. A big apple, but too coarse for dessert and not a late enough keeper to be valuable.

No. 229.—Seedling apple from F. Birch, Wode House, Ont.:—Fruit roundish, medium size; cavity medium depth and width, russeted; stem short, moderately stout; basin medium depth and width, smooth; calyx open; pale green with a bronzy or dull red blush; dots fairly numerous, gray, distinct; skin moderately thick, tough; flesh white, fairly juicy; core medium size; mildly subacid, pleasant; quality good; season early winter. Tree said to be a seedling of Fameuse. Flesh is suggestive of Fameuse, but apple is not worth propagating as compared with the McIntosh Red or Fameuse.

No. 235.—No. 1, from J. Ballantyne, Ottawa East, Ont.:—Fruit conical, roundish, angular, very large; cavity deep, open, russeted; stem slender; basin deep, medium width, wrinkled; calyx open; colour, greenish yellow, well washed and splashed with dark red; dots obscure; skin moderately thick, rather tender; flesh white, ten-

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der, fairly juicy; core small; briskly subacid; quality above medium; season late October, November. A very large apple, but not sufficiently promising to make it desirable.

No. 248.—‘Like Spy’ :—Apple from R. Hamilton, Grenville, Que. :—Fruit oblate, conical, large; cavity deep, open; stem medium length, stout; basin deep, medium width, wrinkled; calyx open; colour pale yellowish green splashed and washed with purplish red; dots obscure; skin moderately thick, tender; flesh white, firm, moderately juicy; core small; subacid; quality above medium; season probably October to November; not specially promising.

No. 249.—‘Lane’ from R. Hamilton Grenville, Que.—Fruit roundish, angular; medium size; cavity narrow, deep; stem short, slender; basin narrow, medium-depth, smooth; calyx open; colour pale yellow, well splashed and washed with red; dots few, yellow, distinct; skin thick, moderately tough; flesh white, slightly tinged with red, juicy; core small; subacid, pleasant flavour; quality good; season probably October to November. Tree growing in fence near lane. Not as good as Wealthy in quality.

No. 250.—‘Calf Pasture’ from R. Hamilton, Grenville.—Fruit oblate, angular, irregular; medium size; cavity medium depth and width; stem medium length, moderately stout; basin shallow, moderately open, wrinkled; calyx open; colour pale green, well washed on sunny side with deep crimson; dots small, yellow, fairly numerous, indistinct; skin moderately thick, tender; flesh white, fine grained, tender, juicy; core medium, subacid, peculiar aftertaste; quality good; season early October; probably seedling of Fameuse, as flesh is Fameuse-like.

PEARS.

Fourteen years’ experiments in the growing of pears at the Central Experimental Farm have shown that this fruit is almost a total failure on sandy loam soil here. The chief cause of failure is blight. This disease has killed many trees outright in one season, while others have been so badly affected that they eventually die. The Longworth pear has been practically free of blight, but this variety is only of medium quality. Of the good varieties which have been tested, Flemish Beauty has proven the hardiest. Even on clay loam soil the pear has not succeeded well in the vicinity of Ottawa.

GRAPES.

This season was one of the most unfavourable in many years for the ripening of grapes. The summer was a cool one and, although there was no autumn frost until October 9, the weather was not sufficiently warm to mature the fruit, and only ten varieties ripened thoroughly. Although most of the grape vines in the vicinity of Ottawa suffered very badly from the severe frost of May 9, fortunately only seven rows out of the twenty-two in the vineyard at the Experimental Farm were uncovered. The injury done to the vines in these seven rows was great, the buds in many cases being destroyed, and the vines thus very much weakened. The crop on the remaining rows was good. It is interesting to note that the following varieties among those in the seven rows uncovered were comparatively little injured by the frost, and produced good crops :—Barry, Delaware, Telegraph, and Essex.

The varieties which ripened this year are :—Champion, Campbell’s Early, Moore’s Early, Early Ohio, Jewel, Moyer, Peabody, Maxatawney, Creveling, and Potter. The Campbell’s Early promises to a valuable variety.

It has been noticed this year and in past seasons, that some varieties which ripen comparatively early when the season is a warm one, do not come any nearer maturity than some of the later kinds when the season is cool but long, thus showing that some varieties require certain high maximum temperatures in order to mature while others only require a moderately high temperature and a longer season.

PLUMS.

The plum trees wintered well this year and made good growth during the summer. The trees were thoroughly sprayed with Bordeaux mixture and Paris green four times, and twice with tobacco water and whale-oil soap to kill aphids, which, however, were confined to only a few trees this year. The plum curculio was more prevalent than usual. On May 9, when the severe frost came, the native plums were in full bloom, the Americana plums nearly in bloom, and the European plums not quite so far advanced. The first were moderately injured; the next, slightly to moderately; and the last practically not injured at all. The crop of native plums was only light to medium; the Americanas, medium to good; and good crops of European plums were obtained from several varieties. The fruit of the native and Americana plums was smaller than usual this year. Last year, three seedling Americana plums which originated at Ottawa, were named and described. This year the following have been thought worthy of description:—

Consul, (Wolf Seedling).—Form roundish; large size; cavity narrow, medium depth, suture a distinct line; apex rounded; colour deep red; dots moderately numerous, yellow, distinct; bloom light; skin moderately thick, tough; flesh deep yellow, juicy; stone medium size, oval, considerably flattened; almost free; flavour sweet; quality good. Season, late September. Will probably prove a useful late plum.

Sunrise, (DeSoto Seedling).—Form oval; large size; cavity narrow, shallow, abrupt; suture a distinct line, not depressed; apex rounded; colour yellow, more or less covered with bright red; dots few, yellow, distinct; bloom moderate; skin thick, moderately tough; flesh deep yellow, juicy; stone large, flat, oval, practically free; flavour sweet; quality good. Season, late September; promising.

Among the European or Domestica plums tested the following three varieties which fruited well this year are the hardiest and bear the most regularly:—

Early Red.—Form oval; medium size; cavity narrow, shallow, abrupt; stem medium length, slender; suture an indistinct line, no depression; apex rounded; colour dull purplish red; dots moderately numerous, yellow, distinct; bloom thin, blue; skin fairly thick, moderately tender; flesh yellowish green, juicy; stone medium size, long, oval, cling; moderately sweet with an acid aftertaste; quality medium. Season, late September. Of the Lombard type. Imported from Russia by Prof. Budd from Dr. Regei, St. Petersburg, during the winter of 1881-2. Prof. Budd writing in 1890 said of this plum, 'This was sent out quite extensively eight years ago marked 'mixed Arab.' The sorts mixed were Early Red, White Nicholas and Black Arab,' most of the trees proved to be Early Red Russian No 3.

Richland.—Form oval; size medium to above; cavity narrow, medium depth; abrupt; stem medium length, $\frac{3}{4}$ -inch, slender; suture a distinct line, no depression; apex rounded; colour deep purplish red; dots fairly numerous, yellow, indistinct; bloom moderate, blue; skin thick, fairly tender; flesh greenish yellow, juicy, moderately firm; stone medium size, oval, flat, cling; sweet but not rich; quality above medium. Season, middle of September. Hardier than most European sorts. Originated on the farm of Randall Elden, Richland, Pennsylvania.

Ungarish.—Form long, oval; size above medium to large; cavity narrow, shallow, abrupt; suture distinct, very slightly if at all depressed; apex round; colour dark purple; dots moderately numerous, indistinct, brown; bloom moderate, blue; skin fairly thick, tender; flesh greenish yellow, firm, fairly juicy; stone large, long, oval, free; moderately sweet; quality above medium; season, middle of September. Introduced by Prof. Budd from C. H. Wagner, Riga Russia.

This plum is somewhat like the Raynes (Dunlops, 53). A prune plum. Promising on account of hardiness.

While the results from experiments in plum culture made at the Central Experimental Farm should be somewhat similar to those obtained in other parts of the pro-

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vines of Ontario and Quebec, where the conditions are nearly the same as at Ottawa, there are many varieties which will not succeed here which will grow and fruit well in certain parts of the province of Quebec, where the temperature falls as low also, but where other climatic conditions are different. This is especially true of parts of the counties of Montmorency, Montmagny, L'Islet, and Kamouraska, where owing to the influence of the St. Lawrence river and the moist atmosphere the conditions are favourable for the successful culture of the best European plums. The successful culture of European plums in L'Islet county has been well demonstrated by Mr. Auguste Dupuis, Village des Aulnaies, Director of the Fruit Stations of the province of Quebec, who has done much to assist in the development of horticulture in the province. This year Mr. Dupuis, had a large number of varieties of plums fruiting, and at my request kindly sent me specimens of the fruit of 17 of them. These were very good indeed. The Washington, Bradshaw, Grand Duke and Pond's Seedling being particularly fine. A fruiting branch of Grand Duke heavily loaded which was sent showed how productive this was with Mr. Dupuis. Following is a description of the Amaryllis, a promising seedling originated by Mr. Dupuis :—

Amaryllis.—Seedling of Mirabelle: Fruit roundish to heart shaped, size above medium to large, cavity medium depth and width, abrupt, stem medium to long, moderately stout, suture distinct, slightly depressed, apex rounded, colour greenish yellow, dots moderately numerous, indistinct, skin moderately thick, moderately tender, flesh yellow, juicy, stone medium size, oval, cling, flavour sweet, rich, quality very good, grown from seed of Mirabelle in 1890. Began to bear in 1896. Tested September 30, 1902.

The climate of the Island of Montreal is a little more favourable for fruit growing than that of the Ottawa district, but the European plums will not succeed as well there as in L'Islet county, and few of the named varieties are satisfactory. For many years a number of European plum seedlings have been grown in the vicinity of Montreal, which have proven hardier than most of the named kinds, and some of these are very valuable. Mr. W. W. Dunlop, of Outremont, Que., has had most to do in bringing these plums into notice, as he has collected and thoroughly tested them at his place. At the summer meeting of the Quebec Pomological Society, held at Aylmer, Que., in August of this year, a committee was appointed to name these plums. As these varieties will probably prove very useful where the climate is even more severe than at Montreal, a copy of this report is herewith given :—

REPORT OF THE COMMITTEE APPOINTED AT THE AYLMER MEETING
TO NAME THE MONTREAL SEEDLING PLUMS, WHICH AT
PRESENT ARE ONLY LOCALLY KNOWN BY
NUMBERS.

September 11, 1902.

The following ten varieties were examined and named, viz :—

No. 54. Large round blue plum, covered with bloom, excellent quality. Size $1\frac{1}{4}$ in. dia. Yellow flesh, nearly free stone. Good market plum. Named, Mount Royal.

No. 53. Large bluish purple, prune shaped, of fair quality, free stone. Size $1\frac{1}{4}$ x $1\frac{1}{2}$ in. in dia. Flesh green, an abundant bearer, good market plum.

Resolved to name this plum 'Raynes' after the late Capt. Raynes of Westmount, who largely distributed the variety.

No. 60. Very large purplish blue plum, size $1\frac{1}{2}$ x 2 in. moderately heavy bearer. Clingstone; flesh green, melting, sweetish; quality fair. Named this plum the 'Lunn Plum'.

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No. 58. Purplish-red plum. Size $1 \times 1\frac{1}{2}$ in. ; good bearer. Quality good ; juicy and sharp ; flesh orange. This plum is a fine preserver and carrier. Named the 'Outremont'.

Seedling of 54. This plum grown by Mr. W. W. Dunlop. Large blue plum. Size $1\frac{1}{4} \times 1\frac{1}{2}$ in. ; quality medium. Clingstone. At request of Mr. Dunlop, name left in abeyance.

No. 91. Purplish-red plum. Size $1\frac{1}{4} \times 1\frac{1}{8}$ in. ; green flesh ; clingstone, juicy, of high quality and pleasant. Abundant bearer. Named 'Harrigan' (after Mr. Harrigan, who introduced it.)

No. 90. Large roundish, yellow plum. Size $1\frac{1}{2} \times 1\frac{3}{4}$ in. Very fine quality and recommended. Flesh light green, juicy and delicious. Clingstone. Named 'Mountain'.

No. 2. Greenish, yellow plum. Size $1\frac{1}{8}$ in. and round. Small, freestone, excellent quality. Known at Quebec as 'Reine Claude de Montmorency'. Heavy and early bearer. Excellent. Named 'Montmorency'.

No. 3. Blue plum about 1-in. dia., freestone of excellent quality. Flesh green and moderately juicy, firm and a splendid shipper. Named 'Brodie' after Mr. Robt. Brodie who introduced it.

No. 4. Yellow plum, size $1\frac{1}{4} \times 1\frac{1}{2}$ in. Flesh yellow and very juicy. Quality good ; an annual bearer ; clingstone. Named 'Lachine.'

Respectfully submitted,

(Signed) W. W. DUNLOP,
ROBT. BRODIE.
R. W. SHEPHERD.

The following more detailed descriptions were made by the writer of the varieties thought to be of most commercial value.

Mount Royal (Dunlop 54).—Fruit received from W. W. Dunlop, Outremont, Que. Form roundish, flattened at stem end ; size medium ; cavity medium to open, medium depth, somewhat flaring ; stem short to medium, moderately stout ; suture distinct, very slightly depressed ; apex rounded, slightly flattened ; colour dark purple ; dots numerous, irregular, distinct ; bloom blue, moderate ; skin moderately thick, moderately tender ; flesh greenish yellow, juicy, firm ; stone below medium, roundish cling ; flavour sweet, moderately rich ; quality good ; season early to mid September. Should be a good shipping plum.

Raynes (Dunlop 53).—Fruit received from W. W. Dunlop, Outremont, Que. :—

Form oval, long, flattened on side of suture ; size above medium to large ; cavity medium depth and width, abrupt ; stem medium length, moderately stout ; suture distinct, slightly depressed ; apex rounded ; colour dark reddish purple ; dots small, numerous, indistinct? bloom moderate, blue ; skin thin, tender ; flesh, yellowish green, firm, fairly juicy ; stone above medium to large, long, oval, free ; moderately sweet ; quality above medium ; season early to middle of September. A prolific bearer and should be a good shipper. A prune plum.

Lunn (Montreal No. 60).—Fruit received from W. W. Dunlop, Outremont, Que. :—

Form oval, broad (round oval) ; size large ; cavity shallow, medium width, slightly flaring ; stem medium length, $\frac{1}{2}$ inch stout ; suture a distinct line, very little if any depression ; apex rounded, very slightly flattened ; colour dark purple ; dots fairly numerous, irregular, indistinct, brownish ; bloom moderate ; blue ; skin, moderately thick, tough ; flesh yellowish green, very juicy, fairly firm ; stone large, oval, cling ; sweet, rich ; quality very good. Season early to middle of September. A fine dessert plum.

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Mountain.—Fruit received from W. W. Dunlop, Outremont, Que. :—

Form roundish, flattened slightly at ends ; size medium to above ; cavity medium depth and width, slightly flaring ; stem medium to long, moderately stout, suture distinct, usually slightly depressed ; apex slightly flattened, colour, greenish yellow, more or less overspread with dull coppery red ; dots numerous, yellow, distinct ; bloom thin, bluish ; skin moderately thick, tough ; flesh yellowish green ; stone above medium, broad, roundish, cling ; sweet, rich : quality very good ; season early to middle September. An excellent dessert plum. Well worth propagation.

The variety known as Lachine is also a profitable kind to grow. It resembles the Yellow Egg somewhat. These varieties are not yet offered for sale by nurserymen, but they should be propagated as soon as possible, as they are valuable.

CHERRIES.

There has not been a good crop of cherries on the Central Experimental Farm since 1898. The best crop since that time was borne this year, but on most trees it was light. A few varieties, however, had a medium to good crop. Everything pointed to a fine crop this year up to May 9, at which time the flowers were almost ready to open. The severe frost of that date destroyed the pistils of a large number of flowers, the result being that the fruit did not set well. The varieties which escaped the frost best and had medium to good crops were :—Orel 25, medium to good crop ; Minnesota Ostheim, medium crop ; Vladimir, medium crop ; Orel 24, medium crop ; Cerise d'Ostheim, medium crop ; Montmorency Ordinaire, medium crop ; Koslov Morello, good crop. These varieties are probably the hardiest. They are all sour cherries and with the exception of Vladimir are of good size and quality. The Vladimir is rather small. These cherries, with the exception of Orel 24 and Koslov Morello, were described in bulletin No. 17, on cherries.

The Koslov Morello cherry is worthy of special mention. In the spring of 1890, Mr. L. Woolverton, Grimsby, Ont., received 50 yearling cherry trees from the late Mr. Jaroslov Niemetz, Winnitza, Podolie, Russia. These were called by Mr. Niemetz, seedlings of Koslov Morello. He recommended them very highly, saying that they bore early and were quite productive. Mr. Niemetz stated that at fifteen years of age they were only 3 feet high. Mr. Woolverton distributed these among the directors of the Ontario Fruit Growers' Association, and sent some to the Central Experimental Farm, and planted ten of them himself. Two of those received here were sent to the Experimental Farm at Agassiz, B.C., and twenty-three were planted. Of these 17 are now living. Mr. Woolverton reports that of the ten he planted 'all but two or three were uniformly valuable and fairly alike in fruit and in season, but two were a little superior to the others. All were very late in season—later than English Morello—and regular and abundant bearers. The trees, though twelve years planted, are still only bushes. The tallest not being over four or five feet high. I have thought they might be grown like berries in cultivated rows.'

Of the trees or bushes growing at the Central Experimental Farm, 15 have fruited, all of which have been different and all quite late. The fruit of some trees was quite bitter, and all are very acid. All of them, with the exception of two, have borne only light crops, the flower buds having been injured by frost like most of the other varieties, but two have proven quite promising, and one particularly so.

Koslov Morello (R. 6. T. 29).—Tree bush-like, planted in 1890. Height $5\frac{1}{2}$ feet. Breadth $8\frac{1}{2}$ feet. Fruit large, long, heart-shaped, slightly flattened, firm ; stem very long, slender ; suture rather indistinct. Skin deep red ; flesh deep red, juicy, very acid ; pit large, long. Season very late. Two pickings were made in 1902, one on August 2, and one on August 8. Total yield $26\frac{1}{2}$ lbs. This variety had a good crop in 1898, and a medium crop in 1900. Although too acid for eating out of hand, it makes preserves of excellent flavour and fine colour.

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Koslov Morello, (R. 6. T. 28).—Tree, bush-like, planted in 1890. Height $7\frac{1}{2}$ feet, breadth 9 feet. Fruit large, heart-shaped, rather deep red, firm; stem long, stout; suture distinct; flesh bright red, very acid; pit, large, oval, flat. A little later in ripening than the last and has not borne as well.

Dwarf cherries, such as the *Koslov Morello*, may yet prove very valuable, even in the best cherry districts. Birds have become so troublesome that it is difficult to save the fruit on large trees, while bushes can be easily covered. Bushes such as these could be planted 10 to 12 feet apart each way and leave ample room for cultivating.

At ten feet apart, 435 trees could be planted on an acre. If these trees all produced as much in one year as that at the Experimental Farm, the yield would be $435 \times 26\frac{1}{2}$ lbs., or 11,527 $\frac{1}{2}$ lbs. of fruit per acre, a very profitable crop indeed. The pits of the best variety were saved this year and planted to get, if possible, still hardier kinds.

STRAWBERRIES.

The strawberries came through the winter in good condition this year and there was practically no winter killing. The plants which were covered in the autumn with a light mulch of oat straw, about four tons to the acre, were uncovered on April 28, and the straw placed between the rows. The practice here is to leave the plants covered in the spring until there is no danger of heating, in order to avoid spring frosts as much as possible. The wisdom of this course was amply shown this year. In most places in this vicinity, where plants were uncovered early or had not been covered at all, the crop was very much lessened by the frost of May 9, which destroyed a large number of blossoms. At the farm some flowers were injured and a few varieties badly injured, but the crop on the whole was good. If it is desired to get early fruit for market a part of the plantation could be uncovered early and the rest left protected. The varieties, the flowers of which were badly injured by frost were:—Marshall, Nick Ohmer, Hunn and Vories.

Most of the varieties which have averaged well for the past three years were described in the report for 1900. Following are descriptions of some that were not:—

Mele. P.—This is certainly the most productive variety in the plantation. It stood second in 1901, and first in 1902, and averages the highest for three years. Foliage, healthy; plant, vigorous. Fruit, above medium to large, roundish or pointed conical, rather pale but glossy red. Soft, acid, medium quality. For near market this might prove a profitable sort.

Bisel, P.—Foliage healthy, plant vigorous. Fruit large, roundish, bright red, handsome, moderately firm, briskly subacid, quality above medium. A good variety.

Enhance, B.—Foliage healthy, plant vigorous. Fruit above medium to large, roundish, dull deep red; flesh firm, bright rich red, meaty, subacid. Quality above medium.

Barton's, Eclipse P.—Foliage healthy, plant vigorous. Fruit large, bright red inclined to have a white tip, irregular, wedge conical; flesh moderately firm, bright red, subacid. Medium quality.

Daniel Boone, P.—This variety is similar to Warfield, but the plant is more vigorous,

Marie, P.—Foliage healthy, plant vigorous. Fruit, large, roundish, glossy, but rather pale red, attractive; flesh, pale red, briskly subacid. Medium quality. Keeps its size well to end of season. This is one of the most promising of the newer sorts.

Buster, P.—Although this variety was described in 1900; it is so little known that it will bear further remarks. This variety is not yet advertised by many nurserymen, although it is one of the best. A few plants were obtained from C. C. Stone, Moline,

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Ill., U.S., in 1895, and for the past five years it has proven one of the most productive sorts. It is said to be a cross between Bubach and Sharpless. It is a pistillate variety, medium to late in season, of large size: rather pale red, moderately firm, and of medium quality. The points which make it superior to many others are its long fruiting season, the fact that it holds its size well to the end of the season, its good foliage, and its great productiveness.

In the following table will be found the yields of 145 varieties for each of the past three years, and the average yield for the three years. The dates of blooming and the time of ripening are also given with other particulars. During the past season 72 varieties were discarded, and these are not included in the table:—

Name.	Average Rank, 1900-1902.	Date of full bloom, 1902.	Date of first ripe fruit, 1902.	Date of first picking, 1902.	Date of last picking, 1902.	Number of pickings, 1902.	Weight of 25 av- erage berries, 1902.	Total yield, 1901.		Total yield, 1902.		Average yield, 1900-1902.	
								Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.
Mele, P.....	1	June 6.	June 23	June 25	July 25	12	6	34	5	35	6	30	10 $\frac{1}{2}$
Steven's Early, P.....	5	" 7.	" 20	" 21	" 18	11	6 $\frac{1}{4}$	10	12	31	8	23	8 $\frac{1}{2}$
Buster, P.....	2	" 7.	" 29	" 30	" 22	9	7	30	12 $\frac{1}{2}$	30	"	27	1 $\frac{3}{4}$
Daniel Boone, P.....	13	" 5.	" 20	" 21	" 18	11	6 $\frac{1}{2}$	23	9 $\frac{1}{2}$	29	6 $\frac{1}{2}$	21	2 $\frac{3}{4}$
Barton's Eclipse, P....	20	" 5.	" 27	" 28	" 22	9	7	23	10 $\frac{1}{2}$	27	2	19	6 $\frac{1}{2}$
Crescent, P.....	39	" 5.	" 19	" 21	" 22	11	4 $\frac{1}{2}$	11	3	26	8	15	13 $\frac{1}{2}$
Bisel, P.....	8	" 7.	July 1	July 2	" 28	10	7 $\frac{1}{2}$	33	3 $\frac{1}{2}$	26	7	22	12 $\frac{1}{2}$
Afton, P.....	4	" 5.	June 24	June 25	" 14	7	6	15	4	25	3	24	4 $\frac{1}{2}$
Stone's Early, P.....	16	" 5.	" 19	" 21	" 25	11	5 $\frac{1}{2}$	17	6	25	5 $\frac{1}{2}$	20	10 $\frac{1}{2}$
Warfield, P.....	11	" 5.	" 21	" 25	" 18	9	5	12	10	25	3 $\frac{1}{2}$	21	12 $\frac{1}{2}$
Hattie Warfield, P....	23	" 5.	" 23	" 25	" 22	10	5 $\frac{1}{2}$	16	1	24	14 $\frac{1}{2}$	18	13 $\frac{1}{2}$
Marie, P.....	.....	" 5.	" 27	" 28	" 25	10	6	.....	.....	24	13	.....	.....
Daisy, P.....	3	" 7.	" 27	" 30	" 25	9	7	18	6	24	1 $\frac{1}{2}$	25	3 $\frac{1}{4}$
Greenville, P.....	6	" 7.	" 26	" 30	" 18	8	7	35	11 $\frac{1}{2}$	23	7	23	4 $\frac{1}{2}$
Beder Wood, B.....	24	" 5.	" 19	" 21	" 22	11	6	25	5	22	15 $\frac{1}{2}$	18	11 $\frac{1}{2}$
Thompson's Late, P.....	14	" 7.	" 27	" 30	" 25	9	6	22	2	22	2	21	1 $\frac{1}{2}$
Clyde, B.....	33	" 5.	" 27	" 28	" 25	10	7	17	3	22	.....	16	9 $\frac{1}{4}$
Dora, P.....	12	" 5.	" 25	" 25	" 22	11	6	26	9 $\frac{1}{4}$	21	13 $\frac{1}{4}$	21	3 $\frac{3}{4}$
John Little, P.....	38	" 5.	" 20	" 21	" 25	10	5 $\frac{1}{4}$	10	11	21	12	16	6 $\frac{1}{2}$
Parker Earle, B.....	29	" 5.	July 1	July 2	" 25	8	7	22	10 $\frac{3}{4}$	21	10 $\frac{1}{2}$	17	11 $\frac{1}{4}$
Swindle, P.....	34	" 8.	" 30	" 2	" 28	10	7	10	12	21	4	16	9 $\frac{1}{2}$
No Name, B.....	21	" 5.	" 24	June 25	" 22	10	6 $\frac{1}{4}$	21	1 $\frac{1}{2}$	21	2 $\frac{3}{4}$	19	4 $\frac{1}{2}$
Porto Rico, P.....	.....	" 7.	" 30	July 2	" 25	9	7	.....	.....	20	11	.....	.....
Enhance, B.....	10	" 5.	" 30	" 2	" 28	8	7 $\frac{1}{4}$	29	5	20	7	22	0
Lovett, B.....	36	" 5.	" 24	June 25	" 25	12	6	21	9 $\frac{1}{2}$	20	5 $\frac{1}{2}$	16	1 $\frac{1}{2}$
Dr. Arp, P.....	26	" 9.	" 29	" 30	" 28	11	6 $\frac{3}{4}$	23	8	20	5	17	12 $\frac{1}{4}$
Howard's 41, P.....	7	" 7.	" 27	" 30	" 22	9	6 $\frac{1}{2}$	24	5 $\frac{1}{2}$	20	5	23	4 $\frac{1}{2}$
Sample, P.....	.....	" 7.	July 1	July 2	" 25	9	7 $\frac{1}{4}$	30	15	20	4 $\frac{1}{2}$	.....	.....
Cyclone, P.....	31	" 7.	June 29	June 30	" 25	11	7 $\frac{1}{4}$	20	7	20	4	16	10 $\frac{1}{2}$
Glen Mary, B.....	9	" 5.	" 30	July 2	" 25	10	8 $\frac{1}{4}$	28	12 $\frac{1}{4}$	20	0 $\frac{3}{4}$	22	8 $\frac{1}{2}$
G. H. Caughell, B.....	28	" 5.	July 2	" 4	" 25	9	6 $\frac{1}{2}$	23	3 $\frac{1}{2}$	19	13	17	12 $\frac{1}{2}$
Wm. Belt, B.....	56	" 7.	" 2	" 4	" 25	7	7 $\frac{1}{4}$	17	10 $\frac{1}{2}$	19	7	12	15 $\frac{1}{2}$
Senator Dunlap, B.....	.....	" 5.	June 24	June 25	" 22	10	6 $\frac{1}{2}$	9	6	19	7	.....	.....
Bomba, P.....	35	" 5.	" 19	" 21	" 18	10	5 $\frac{1}{4}$	9	0	19	6 $\frac{3}{4}$	16	7 $\frac{1}{2}$
X. 288, P.....	50	" 5.	" 27	" 28	" 22	10	5	9	8	19	4 $\frac{1}{2}$	13	10 $\frac{1}{2}$
Carleton, P.....	15	" 5.	" 27	" 28	" 18	8	6	16	10 $\frac{1}{2}$	19	4	20	10 $\frac{1}{2}$
Bubach, P.....	30	" 7.	" 27	" 28	" 18	10	9 $\frac{1}{2}$	29	5 $\frac{1}{4}$	17	14 $\frac{1}{2}$	17	21 $\frac{1}{2}$
Tennessee Prolific, B.....	42	" 7.	" 27	" 30	" 22	9	7	23	2	17	14	15	1 $\frac{1}{2}$
Carrie, P.....	27	" 7.	" 27	" 30	" 28	10	8 $\frac{1}{4}$	29	15	17	13 $\frac{1}{4}$	17	12 $\frac{1}{2}$
Mattie Warfield, P.....	17	" 5.	" 21	" 25	" 14	8	6	20	6	17	13	20	2 $\frac{1}{2}$
Cole's Seedling, B.....	.....	" 9.	July 3	July 4	" 25	9	7 $\frac{1}{2}$	25	0	17	11	.....	.....
Gandy Belle, B.....	64	" 5.	June 27	June 30	" 25	9	7 $\frac{1}{2}$	11	13	17	11	12	2 $\frac{1}{2}$
Boynton, P.....	69	" 5.	" 19	" 21	" 25	11	5	6	15	17	1	11	4
Maggie, P.....	19	" 5.	" 20	" 21	" 18	10	5	22	3 $\frac{1}{2}$	16	14 $\frac{1}{2}$	19	8 $\frac{3}{4}$
Brandywine, B.....	41	" 7.	July 2	July 4	" 25	6	8	20	1	16	8	15	6 $\frac{1}{4}$
Haverland, P.....	58	" 5.	June 26	June 28	" 22	10	6 $\frac{1}{2}$	10	8 $\frac{1}{2}$	16	8	12	12 $\frac{3}{4}$
Satisfaction, B.....	44	" 5.	" 29	" 30	" 25	9	6 $\frac{1}{4}$	11	13	16	6 $\frac{3}{4}$	14	7 $\frac{1}{4}$
Anna Forest, P.....	53	" 5.	" 24	" 25	" 22	10	7 $\frac{3}{4}$	17	15 $\frac{1}{2}$	16	5 $\frac{1}{2}$	13	4 $\frac{1}{4}$
Scarlet Ball, P.....	65	" 7.	July 2	July 4	" 28	8	8	13	13 $\frac{1}{2}$	16	4	11	13
Enormous, P.....	43	" 5.	June 25	June 28	" 25	10	9	22	12 $\frac{1}{2}$	16	3 $\frac{3}{4}$	14	15 $\frac{1}{2}$
Arkansas Traveller, B....	25	" 5.	" 27	" 28	" 25	10	6 $\frac{1}{4}$	29	10	15	14 $\frac{1}{4}$	18	6 $\frac{1}{4}$

Name.	Average Rank, 1900-1902.	Date of full bloom, 1902.	Date of first ripe fruit, 1902.	Date of first picking, 1902.	Date of last picking, 1902.	Number of pickings, 1902.	Weight of 25 av- erage berries, 1902.	Total yield, 1901.	Total yield, 1902.	Average yield, 1900-1902.
							Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.
Wonderful, P.....	18	June 7.	June 27	June 28	June 25	10	6 $\frac{1}{4}$	21 13	15 14 $\frac{1}{4}$	19 14 $\frac{1}{2}$
Lady Rusk, P.. ..	52	" 5.	" 27	" 28	" 18	9	6 $\frac{1}{4}$	13 10	15 14	13 8 $\frac{1}{2}$
Princess, P.....	48	" 7.	" 27	" 28	" 25	10	6 $\frac{1}{2}$	22 11	15 11 $\frac{1}{2}$	13 15 $\frac{5}{6}$
Rough Rider, B.....	....	" 9.	July 2	July 2	" 25	9	7 $\frac{3}{4}$	7 0 $\frac{1}{2}$	15 4 $\frac{1}{4}$	....
Morgan's Favorite, B.....	51	" 5.	June 26	June 28	" 18	8	7 $\frac{3}{4}$	21 1	15 1 13	9 9 $\frac{3}{4}$
Hood River, P.....	46	" 7.	" 27	" 30	" 18	7	8	23 9	14 15 $\frac{1}{4}$	14 5 $\frac{5}{6}$
Williams, B.....	22	" 7.	" 25	" 28	" 22	8	7	26 4	14 15	18 14
Judsonia, B.....	37	" 7.	" 26	" 26	" 18	8	6	14 9 $\frac{3}{4}$	14 7 $\frac{1}{2}$	16 11 $\frac{1}{2}$
Hatch Exp. Station, B...	61	" 7.	July 3	July 4	" 25	9	6 $\frac{1}{2}$	21 2 $\frac{1}{2}$	14 6 $\frac{1}{2}$	12 7 $\frac{3}{4}$
Sherman, B.....	45	" 5.	June 27	June 30	" 18	8	6	22 7	13 15	14 6
Irene, P.....	..	" 5.	" 27	" 28	" 25	10	5 $\frac{3}{4}$	....	13 11 $\frac{1}{2}$	....
Mrs. Cleveland, P.....	57	" 5.	" 27	" 28	" 18	7	5 $\frac{3}{4}$	14 0	13 10 $\frac{1}{2}$	12 13 $\frac{7}{8}$
World's Champion, B...	32	" 9.	" 30	" 30	" 28	11	7 $\frac{1}{2}$	29 2	13 8 $\frac{1}{4}$	16 9 $\frac{5}{8}$
Sadie, B.....	59	" 7.	" 21	" 25	" 22	10	4 $\frac{1}{2}$	19 15	13 7 $\frac{1}{2}$	12 9 $\frac{1}{2}$
Snow's Perfection, B.....	....	" 7.	" 30	" 30	" 25	10	7	....	13 4 $\frac{1}{4}$	....
Pennell, B.....	....	" 7.	July 1	July 2	" 22	8	7	9 12	13 4	....
Kansas Prolific, B.....	54	" 5	June 23	June 25	July 18	10	4 $\frac{1}{2}$	23 11	13 21 $\frac{1}{4}$	13 2 $\frac{7}{8}$
Jucunda Imp., B.....	....	" 7	" 28	" 28	" 18	8	6 $\frac{1}{4}$	....	13 2	....
Kyle, B.....	40	" 7	July 2	July 4	" 25	8	7	23 15 $\frac{1}{2}$	12 15	15 7 $\frac{5}{6}$
Leroy, P. ....	....	" 5	June 25	June 28	" 22	11	6 $\frac{1}{4}$	....	12 14 $\frac{1}{2}$	..
Excelsior B. ....	....	" 5	" 20	" 21	" 14	9	4 $\frac{1}{4}$	10 1	12 14 $\frac{1}{4}$	..
Sharpless Seedling, B.....	....	" 7	July 2	July 2	" 25	8	9	15 11 $\frac{1}{2}$	12 10 $\frac{1}{2}$	..
Bismarck, B. ....	....	" 5	June 23	June 25	" 18	9	6 $\frac{1}{2}$	2 15	12 9	..
Beverly, B.....	77	" 7	" 27	" 30	" 25	8	6 $\frac{1}{2}$	13 10 $\frac{1}{2}$	12 8	9 5
Twilight, B.....	....	" 5	" 23	" 25	" 25	10	6	9 3 $\frac{1}{2}$	12 8	..
189, B.....	63	" 5	" 27	" 28	" 22	9	6	16 14 $\frac{1}{2}$	12 7	12 2 $\frac{5}{8}$
Ona, P.	68	" 5	" 20	" 21	" 18	10	5 $\frac{1}{4}$	13 9	12 0	11 6 $\frac{5}{6}$
Kansas, P.....	....	" 7	" 29	" 30	" 25	9	6 $\frac{1}{4}$	....	11 9 $\frac{1}{2}$	..
Avery Seedling, P.....	104	" 5	" 24	" 25	" 22	11	7	4 10	11 8 $\frac{1}{4}$	5 13 $\frac{1}{4}$
Saunders, B.	75	" 7	" 28	" 30	" 18	7	7	10 9	11 6 $\frac{1}{2}$	9 11
X. 119, B. ....	....	" 5	" 27	" 30	" 25	9	6	11 13 $\frac{1}{2}$	11 6	..
Greenville Seedling, B...	79	" 5	" 27	" 28	" 18	8	6 $\frac{1}{2}$	7 6	11 5 $\frac{1}{2}$	9 1 $\frac{7}{8}$
Sam Sperry, B.....	71	" 7	July 2	July 4	" 25	7	7	5 1	11 5	10 12 $\frac{1}{4}$
H. H., P.....	89	" 5	June 19	June 21	" 14	9	5 $\frac{1}{2}$	8 5 $\frac{1}{2}$	11 4 $\frac{3}{4}$	7 5 $\frac{1}{8}$
Van Deman, B.....	72	" 5	" 20	" 21	" 22	11	6	12 9	11 4	10 3 $\frac{1}{2}$
Ridgeway, B.....	70	" 5	July 6	July 8	" 25	6	7	19 12	10 14	11 3 $\frac{1}{2}$
New Dominion, B....	47	" 5	" 3	" 4	" 25	9	6 $\frac{1}{2}$	17 9 $\frac{1}{2}$	10 11 $\frac{1}{2}$	14 2 $\frac{1}{2}$
Anna Kennedy, P.....	62	" 7	June 23	June 25	" 18	9	5	18 4	10 11	12 3 $\frac{1}{2}$
X 77, P.	82	" 9	July 1	July 2	" 25	9	7 $\frac{1}{2}$	8 1	10 11 $\frac{1}{2}$	8 13 $\frac{3}{8}$
Bennett, P.....	....	" 5	June 23	June 25	" 18	9	6	5 1 $\frac{1}{2}$	9 14 $\frac{3}{4}$	..
Little No. 30, P.....	....	" 7	July 1	July 2	" 22	7	6 $\frac{3}{4}$	6 8	9 12	..
Gandy, B.....	81	" 9	" 5	" 6	" 25	8	7	13 0 $\frac{1}{2}$	9 12	8 15 $\frac{3}{8}$
Maximus, B.....	96	" 7	June 30	June 30	" 22	9	8 $\frac{1}{2}$	7 13	9 11	6 7 $\frac{1}{2}$
Osceola, B.....	87	" 5	" 18	" 21	" 11	8	4	7 12 $\frac{1}{4}$	9 6 $\frac{1}{4}$	7 14 $\frac{1}{2}$
Della, B.....	101	" 5	" 30	July 4	" 25	8	6 $\frac{1}{2}$	8 4	9 4	6 1
Budd's No. 7, B.....	88	" 5	" 23	June 25	" 14	8	6 $\frac{1}{2}$	12 15	9 2 $\frac{1}{2}$	7 13 $\frac{3}{8}$
Oberholtzer, No. 2, P....	100	" 7	July 2	July 4	" 25	7	7 $\frac{1}{4}$	3 4 $\frac{3}{4}$	9 0 $\frac{1}{2}$	6 3 $\frac{1}{2}$
W. J. Bryon, B. ....	....	" 7	June 30	" 2	" 25	8	7	7 10 $\frac{1}{2}$	8 15 $\frac{3}{4}$	..
Lloyd's Favorite, P.....	49	" 9	" 27	June 30	" 22	9	7 $\frac{1}{4}$	26 10	8 13	13 13
Timbrell, B.....	98	" 5.	" 29	" 30	" 25	10	6 $\frac{1}{4}$	8 9 $\frac{1}{2}$	8 10 $\frac{1}{2}$	6 6 $\frac{1}{2}$
Wilson, B.....	....	" 5.	" 20	" 21	" 22	11	5 $\frac{1}{4}$	....	8 9	....
Hawaii.....	....	" 5.	" 6	" 21	" 14	9	4 $\frac{1}{2}$	....	8 7 $\frac{1}{4}$	....
Young's Seedling, B.....	60	" 7.	" 22	" 25	" 18	9	5 $\frac{1}{2}$	15 10 $\frac{1}{2}$	8 7 $\frac{1}{4}$	12 8 $\frac{1}{4}$
Winnie Warfield, P.....	73	" 5.	" 29	" 30	" 22	8	5 $\frac{1}{2}$	13 12 $\frac{1}{4}$	8 4	9 13 $\frac{1}{4}$
New York, B.....	....	" 5.	" 28	" 30	" 18	8	6 $\frac{1}{2}$	....	7 15 $\frac{3}{4}$	....
Eleanor, B.....	95	" 5.	" 20	" 21	" 18	10	5	7 13 $\frac{1}{4}$	7 5 $\frac{3}{4}$	6 7 $\frac{3}{8}$
Vories, B.....	66	" 5.	" 20	" 21	" 14	9	5	26 8 $\frac{1}{2}$	7 5 $\frac{1}{4}$	11 12 $\frac{1}{2}$
Emperor, B.....	....	" 9.	July 3	July 4	" 25	7	7 $\frac{1}{4}$	4 6	7 2 $\frac{1}{4}$	....
Jucunda, B.....	74	" 5.	June 27	June 30	" 18	7	6 $\frac{1}{2}$	17 10 $\frac{1}{2}$	7 0 $\frac{1}{2}$	9 11 $\frac{1}{2}$
Logan, B.....	67	" 9.	" 27	" 30	" 18	8	5 $\frac{1}{4}$	21 3 $\frac{1}{2}$	6 14	11 10 $\frac{1}{2}$
Johnston's Early, B.. .	85	" 5.	" 27	" 30	" 25	8	6 $\frac{1}{2}$	14 14	6 9	8 5 $\frac{1}{6}$
McKinley, B.....	91	" 7.	" 30	July 2	" 18	6	8 $\frac{1}{4}$	11 5 $\frac{1}{2}$	6 7	6 12
Parson's Beauty, B.....	....	" 5.	" 24	June 25	" 18	9	6 $\frac{1}{2}$	....	6 5 $\frac{3}{4}$	....
X 341, B.....	78	" 5.	" 19	" 21	" 14	8	4 $\frac{1}{2}$	14 15 $\frac{1}{2}$	5 14 $\frac{1}{2}$	9 4 $\frac{1}{2}$
Lincoln, P.....	55	" 5.	" 19	" 21	" 14	8	4	23 12	5 11 $\frac{1}{2}$	12 15 $\frac{1}{2}$

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Name.	Average rank, 1900-1902.	Date of full bloom, 1902.	Date of first ripe fruit, 1902.	Date of first picking, 1902.	Date of last picking, 1902.	Number of pickings, 1902.	Weight of 25 av- erage berries, 1902.	Total yield, 1901.	Total yield, 1902.	Average yield, 1900-1902.
							Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.
Edgar, B.....	86	June 7.	June 27.	June 30.	July 18.	7	5 $\frac{1}{4}$	8 6	5 10 $\frac{1}{2}$	8 2 $\frac{3}{4}$
Nettie, P.....	.....	" 7.	July 7.	July 8.	" 18.	4	9	.....	5 10	.....
Joe, B. ....	.....	" 9.	" 2.	" 2.	" 22.	8	6 $\frac{1}{2}$	.....	5 10	.....
Michel's Early, B.....	99	" 5.	June 18.	June 21.	" 11.	8	4 $\frac{3}{4}$	9 7 $\frac{1}{2}$	5 11 $\frac{1}{2}$	6 5 $\frac{7}{8}$
Sharpless, B.....	84	" 5.	" 30.	July 2.	" 18.	6	6 $\frac{1}{4}$	15 2	5 0 $\frac{1}{2}$	8 9 $\frac{1}{2}$
Orange County, P..	105	" 5.	" 23.	June 25.	" 14.	8	6	5 4	4 13	5 8 $\frac{3}{4}$
Gladstone, B.....	102	" 7.	July 2.	July 2.	" 22.	7	9	10 3	4 11 $\frac{3}{4}$	5 14 $\frac{1}{2}$
Louis Gauthier, B.....	80	" 9.	" 7.	" 8.	" 28.	7	8	17 15	4 8	9 0 $\frac{1}{2}$
Mayflower, B.....	.....	" 5.	" 16.	" 21.	" 11.	8	5	10 7 $\frac{1}{2}$	4 2	.....
Magoon, B.....	93	" 5.	July 1.	July 2.	" 22.	7	7 $\frac{1}{2}$	10 4	4 1	6 8 $\frac{1}{2}$
Snowball, B.....	90	" 7.	June 29.	June 30.	" 25.	10	6 $\frac{1}{2}$	9 12 $\frac{3}{4}$	3 9	6 15 $\frac{1}{2}$
Nick Ohmer, B.....	76	" 7.	" 30.	" 30.	" 22.	8	6 $\frac{1}{2}$	20 7	3 9	9 9 $\frac{1}{2}$
Jessie, B.....	107	" 5.	" 25.	" 25.	" 14.	8	5 $\frac{1}{2}$	6 11 $\frac{1}{2}$	3 4 $\frac{1}{4}$	4 0 $\frac{5}{8}$
Cruses No. 9, P.....	92	" 5.	" 27.	" 30.	" 18.	7	6 $\frac{1}{2}$	7 1	3 2	6 11 $\frac{1}{4}$
Gibson, B.....	.....	" 7.	" 30.	July 2.	" 22.	6	6	.....	2 9	.....
Klondike, B.....	94	" 7.	July 10.	" 11.	" 25.	5	6	13 1	2 8	6 8
Sampson, B.....	.....	" 7.	" 7.	" 8.	" 18.	4	.....	.....	2 7	.....
Bouncer, B.....	108	" 7.	" 10.	" 11.	" 22.	4	6 $\frac{1}{2}$	8 15 $\frac{3}{4}$	2 5	3 15 $\frac{3}{4}$
Albert, B.....	.....	" 8.	" 6.	" 8.	" 25.	6	7	6 7	2 2 $\frac{1}{2}$	.....
Noble, B.....	106	" 5.	" 2.	" 4.	" 14.	4	7	5 8	2 2	5 5 $\frac{5}{8}$
Champion of England, B.	83	" 5.	" 3.	" 4.	" 14.	5	6 $\frac{3}{4}$	14 6 $\frac{1}{2}$	2 1 $\frac{1}{2}$	8 11 $\frac{5}{8}$
Great American.....	.....	" 9.	" 7.	" 9.	" 22.	6	7	2 15	2 0 $\frac{1}{2}$	.....
Iowa Beauty, B.....	97	" 5.	June 25.	June 28.	" 28.	6	4 $\frac{1}{2}$	9 9	1 11	6 7
Hunn, P.....	110	" 9.	July 12.	July 14.	" 28.	4	6	7 2	1 9 $\frac{1}{2}$	3 8
St. Joseph, B.....	109	" 5.	June 27.	June 30.	" 14.	7	3 $\frac{1}{2}$	5 14	1 9 $\frac{3}{4}$	3 9
Empress, B.....	.....	" 7.	" 27.	" 28.	" 8.	5	5 $\frac{1}{2}$	.....	1 9	.....
Marshall, B.....	103	" 7.	July 6.	July 8.	" 22.	5	6 $\frac{1}{2}$	11 9 $\frac{1}{4}$	1 8 $\frac{1}{2}$	5 13 $\frac{3}{8}$
Leamington.....	.....	" 5.	" 1.	" 2.	" 11.	4	.....	7 15	0 12	.....

RASPBERRIES AND BLACKBERRIES.

The raspberry crop was only medium this year owing to the severe frost of May 9, which injured the leaves and weakened the canes very much. A new plantation was made in the autumn of 1901, consisting of 63 varieties. These made good growth this summer and when vacancies occurred they were filled up. The Herbert raspberry, originated by Mr. R. B. Whyte, Ottawa, Ont., again did well. It and the Sarah, a seedling originated by Dr. Wm. Saunders, were among those least affected by the spring frost. These are two of the hardiest varieties which have been tested here. Marlboro and Cuthbert are two of the best older commercial varieties. The Clarke is also a good kind for home use. The crop of blackberries was light, though there was more fruit this year than usual.

CURRANTS.

There was a good crop of currants this year, notwithstanding the severe spring frosts which occurred when they were in full bloom. The varieties in the new plantation grew very well and many of the bushes fruited this year. Among red varieties, Wilder, Greenfield, Pomona and Fay's Prolific are four of the best for commercial purposes, while Defiance and Benwell are promising. The Moore's Ruby and Early Scarlet are two of the best for home use, being milder in flavour. In black varieties, the Standard, Success, Climax, and Victoria are four of the best. The last named is not a heavy cropper, but is very large. Topsy is very promising. Following is a description of it

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Topsy.—Fruit large, black, very glossy, sweet, good flavour; quality very good; fruit clings exceptionally well, which makes it especially valuable. Bush productive. It originated with Dr. Wm. Saunders as follows:—Some seeds of a cross between Dempsey's black currant and a cross-bred gooseberry (Houghton X Broom Girl) were sown in a pot in the greenhouse in the autumn of 1890. Five plants grew. Of these, four had gooseberry foliage and one, black currant foliage. The latter was planted out in 1891 and has been called Topsy.

GOOSEBERRIES.

The European gooseberries did better this year than ever before, but the crop was light on most varieties. A determined effort was made to prevent the spread of mildew this season, but it was only partially successful. Beginning when the leaf buds were breaking, on April 18, the bushes were sprayed thoroughly every week with a solution in the proportion of 1 oz. potassium sulphide and 2 gallons of water. This was continued until June 5, when traces of mildew being noticed, the bushes were sprayed twice a week until July 19, making 20 sprayings in all. Notwithstanding this thorough and constant application of a fungicide, the leaves dropped badly from most European varieties, though what fruit remained on the bushes was not nearly as much affected as usual. In some gardens in the city of Ottawa very fine, clean European gooseberries can be grown without spraying. Whether this is due to the kind of soil or to the moister atmosphere in a closely planted garden has not yet been determined.

Among the American varieties, the Downing, Pearl, and Red Jacket (Jocelyn) are the most profitable, though some of Dr. Saunders' newer seedlings are very promising.

SPRAYING.

In no season, probably, since spraying has been recognized as necessary to successful fruit culture has the value of it been more apparent than this year. The crop of fruit was abundant, but conditions were very favourable for the development of fungous diseases. What promised to be a good apple crop in the early part of the season was very much lessened in value by the development of the black spot fungus and the percentage of No. 1 apples was small where trees were unsprayed. Thorough spraying, though difficult to manage owing to showery weather, prevented the spread of the disease, and there were many instances where men who sprayed well had a large percentage of clean fruit. Although it is recommended to spray winter apples five, or even six, times during the season, many persons do not spray more than three times. This is a great mistake, as was amply demonstrated this year, as the black spot developed late and where spraying had been discontinued the fruit was moderately to badly affected. The expense of spraying is considerable and it is money thrown away to not do the work thoroughly and frequently.

In Great Britain and Europe during the past three years a mixture has been made with washing soda to neutralize the sulphate of copper instead of lime. It is claimed that this mixture adheres better than the ordinary Bordeaux mixture. Tests were made at the Central Experimental Farm this year to learn how much soda was necessary to neutralize 4 lbs. of bluestone, and it was found that 5 lbs. were needed. The formula for the preparation of the soda mixture would thus be:—

4 lbs. copper sulphate.

5 lbs. washing soda.

40 gallons water.

An experiment was tried to determine the value of this mixture as compared with the ordinary Bordeaux, but as none of the fruit was spotted no conclusions could be drawn. The soda mixture is well worthy of a trial, for although a little more expensive, it is more easy of application than that made with lime, and often good lime is hard to get in the country.

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FUNGOUS DISEASES AND OTHER INJURIES.

The following fungous diseases and other injuries are thought worthy of special mention this year :—

Sooty Fungus or Fly Speck Fungus (*Leptothyrium pomi*). My attention was called to this disease by Mr. Alex. McNeill, Chief Fruit Inspector for the Dominion. It is not a common disease in Ontario, but was more prevalent than usual in the vicinity of St. Catharines this year. The following quotation from a letter received from Mr. Robert Thompson, St. Catharines, Ont., gives information regarding it. He writes : ' We have had it here in very low lying orchards, in flats or creeks or orchards in valleys in damp seasons, but never very much. This season it is more prevalent. It has always been called by the buyers in Montreal 'The Cloud' and the fruit is called 'clouded fruit'. This disease also occurred to a limited extent in the orchard of Mr. D. J. McKinnon, Grimsby, Ont., who submitted a specimen of affected fruit for examination. The Sooty Fungus is more prevalent in some of the Eastern States than it is in Canada, the variety of apple most affected being the Rhode Island Greening.

The disease appears on the surface of the skin in irregular, black, sooty-like patches, which look not unlike splashes of ink. Fortunately, it is easily controlled and one spraying with Bordeaux mixture when the apples are about the size of hickory nuts is said to prevent the spread of it.

Russetting of Apples.—The skin of apples russetted badly in 1902, from Prince Edward Island westward to the province of Ontario, and there has been much discussion as to its cause. At the Central Experimental Farm a few varieties are russetted every year, but this season more kinds were affected.

It is our opinion that the russetting was due to spraying and that some kinds are more subject than others. This year, by mistake, a very strong copper sulphate mixture was put on a few trees here. The fruit on these was much more russetted than on those which received the regular mixture, showing that the strong mixture had caused russetting. It is our belief that owing to the exceptionally cool season the skins of apples were not as tough as usual, and that the ordinary Bordeaux mixture caused the russetting which occurred in different parts of the country. Statements have been made that the fruit was russetted on both sprayed and unsprayed trees in orchards, and others have said that the russetting only occurred where the trees were sprayed. Closer observations will be made next year.

Dropping of Apple Leaves.—The leaves of apple trees dropped badly this year, especially during the month of July. This dropping occurred in the Maritime provinces, in the province of Quebec and also in Ontario. It was also common in the eastern states. Small brown patches first appeared on the leaves which gradually became yellow and dropped off. The brown patches looked as if they were caused by scald. They were put under a high power microscope at the Central Experimental Farm and no trace of disease could be found. In one orchard visited it was noticed that there was little or no injury where the leaves did not get the direct rays of the sun. This injury occurred in both sprayed and unsprayed orchards. There is a leaf disease in the United States which causes injury somewhat like this, but as no disease was to be found the only present explanation of the dropping is that it was caused by unusual climatic conditions.

Black Rot of the Cabbage.—Since 1899 the cabbages at the Experimental Farm have been affected with the disease known as black rot and this year they were badly injured by it. The mid season and late varieties have been most affected. This disease has only been recognized since 1889, when it was found in Kentucky, but it has become very troublesome within the past ten years, and now occurs in the United States in a great many states and does serious damage to this vegetable. It has not, however, been often reported in Canada. The only report this year was from A. Bangel, Nicolet, Que., who wrote that it was doing much damage to his cabbages. It attacks cauliflowers, Brussels sprouts and turnips and some other allied vegetables.

The first indication of the disease is a wilting and turning yellow of parts of the outer leaves and finally of whole leaves. The disease rapidly spreads to other parts until the whole head is affected and becomes an unsightly mass of rotting leaves. Sometimes the stem is so badly affected that the leaves wither, even though not all diseased. When the outside leaves are destroyed the head bursts and becomes useless. The germs of the disease usually enter from the margin of the leaves through the pores which exude the drops of water so familiar to the cabbage. The germs lodge in these drops and from them enter the leaf pores and gradually spread through the leaf. It is thought that insects also carry the disease. The germs remain over winter in the decaying vegetables and in the spring infect the new plants. The germs are also spread by manure from stock which have been fed with infected plants.

The only known remedy for the disease is prevention. Cabbages should not be planted on land where the disease has been the year before.

The diseased leaves and plants should be taken away and burned as soon as noticed and on no account should they be fed. All cruciferous weeds such as wild mustard should be destroyed. Sow seed in new soil every year.

Owing to the serious damage done to cabbage by this disease, its spread should be prevented if possible.

The late varieties which have been least affected during the past four years have been the Late Flat Dutch types, such as Premium Flat Dutch, Bloomsdale Large Late Flat Dutch, All Seasons, Henderson's Selected Late Flat Dutch and Large Late Flat Dutch.

More information regarding this disease can be obtained from Bulletin, No. 65, Agricultural Experiment Station, Wisconsin; Bulletin No. 66 Vermont; and Farmers' Bulletin No. 68, Department of Agriculture, Washington, D.C., U.S.

VEGETABLES.

Experiments in testing the different varieties of nearly all the kinds of vegetables and experiments in different methods of culture were continued this year. Owing to the cold spring and late frost, the melons failed and the cucumbers were poor but nearly everything else did well. For the past three years selections have been made of beans and pease with a view to originating earlier and more productive strains and in the case of beans a marked difference in time of being ready for use is already noticed. The experiments with potatoes have been the most varied, as the potato is such an important vegetable. For the past four years a 'List of Best Vegetables for Farmers' has been given, but this is omitted this year owing to the lack of space and also for the reason that no changes of any importance are necessary.

EXPERIMENTS WITH POTATOES.

The yields of the varieties of potatoes in the uniform test plots were very good this year. The largest crop was from the Peachblow, an old variety, which yielded at the rate of 772 bushels 12 pounds per acre, being the highest yield of potatoes ever recorded at the Central Experimental Farm. The fine crop this year was due principally to good seed, thorough cultivation and thorough spraying with Bordeaux mixture to prevent blight and rot and Paris green to kill the potato beetle. A good growing season also favoured the development of the tubers. Early planted potatoes were injured by spring frosts which injured the vines and weakened the plants.

There were 131 varieties tested in uniform plots this year. The difference between the highest and lowest yields was 618 bushels 12 pounds per acre which shows the value of planting the most productive kinds. The loss from planting inferior varieties must be enormous every year. The average yield per acre from all the varieties tested was 429 bushels per acre.

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The test was made on good sandy loam soil which was given a moderate dressing of well rotted manure on April 23. This was ploughed under on April 24. Shortly before planting, the soil was brought into good condition and the manure thoroughly mixed through it by harrowing twice with the disc harrow and once with the smoothing harrow. Drills $2\frac{1}{2}$ feet apart and 4 inches deep were opened with the double mold board plough and 66 sets of each variety were planted 1 foot apart in a single row. The sets were of good size, having at least three eyes and a liberal amount of flesh. The large yields which are obtained nearly every year are no doubt to a large extent due to the fact that a perfect stand is obtained by using good sets. The soil was harrowed once before the plants were above ground to destroy weeds and then kept loose with the cultivator until the vines were too large to get through without doing damage. The vines were sprayed with Paris green to destroy the potato beetle and three times with Bordeaux mixture to prevent rot and blight. The potatoes were planted on May 27 and dug on October 8, 9 and 10.

POTATOES—Test of Varieties.

No.	Name of Variety.	Quality.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Un-marketable.		Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
1	Peachblow	Medium ...	772	12	690	48	81	24	White.
2	Flemish Beauty.....	Poor.	697	24	624	48	72	36	Bright pink.
3	Dr. Maercher.....	Medium....	695	12	644	36	50	36	White.
4	Irish Cobbler.....	Good.....	646	48	563	12	83	36	"
5	Money Maker.....	"	622	36	583	0	39	36	"
6	Late Puritan.....	"	613	48	486	12	127	36	"
7	Troy Seedling	Medium....	609	24	532	24	77	0	"
8	Irish Daisy.....	Good.....	605	0	473	0	132	0	"
9	Dakota Red.....	Medium....	594	0	550	0	44	0	Red.
10	Pearce.	Good.....	574	12	481	48	92	24	Pink and white.
11	Brown's Rot Proof.	Medium....	565	24	501	36	63	48	Pink.
12	Carman No. 1	Good.	552	12	503	48	48	24	White.
13	Mammoth Pearl.....	"	552	12	488	24	63	48	"
14	Early Elkinah.....	Good.....	545	36	440	0	105	36	Pink.
15	Swiss Snowflake	Good.....	532	24	497	12	35	12	White.
16	Livingston.....	"	530	12	446	36	83	36	White, pink eye.
17	Wonderful.....	"	519	12	413	36	105	36	"
18	Bergeron.....	Medium....	517	0	470	48	46	12	"
19	Sabean's Elephant	Good.	517	0	435	36	81	24	White.
20	American Wonder	"	508	12	462	0	46	12	"
21	Hale's Champion.	Poor.	506	0	448	48	57	12	"
22	Napoleon.....	Good.....	506	0	462	0	44	0	Pink.
23	Enormous	"	501	36	457	36	44	0	White.
24	Sharpe's Seedling.....	"	499	24	453	12	46	12	Pink and white.
25	Reeves' Rose.	"	497	12	426	48	70	24	Pink.
26	Rawdon Rose.....	Good.....	497	12	418	0	79	12	Pink and white.
27	I.X.L.	"	492	48	453	12	39	36	"
28	Country Gentleman.	"	488	24	420	12	68	12	"
29	Montana Bluff.....	"	488	24	413	36	74	48	White, bright pink eye.
30	Jubilee	Good.....	486	12	451	0	35	12	Pink and white.
31	Early St. George.	"	481	48	400	24	81	24	"
32	Burnaby Mammoth.....	"	479	36	418	0	61	36	"
33	Quaker City.....	"	477	24	415	48	61	36	White.
34	Northern Spy.....	Poor.	473	0	426	48	46	12	Bright pink.
35	Maule's Thoroughbred ...	"	473	0	409	12	63	48	Pink.
36	Rochester Rose.	Good.	473	0	402	36	70	24	"
37	Delaware	"	473	0	391	36	81	24	White.
38	Carman No. 3	"	470	48	435	36	35	12	"
39	Clay Rose	Medium....	470	48	424	36	46	12	Pink.
40	Dublin Prize.....	"	466	24	409	12	57	12	"
41	Brosseau.....	"	464	12	444	24	19	48	Red and white.
42	Early Norther.....	Good.....	464	12	420	12	44	0	Pink.
43	Daisy	"	464	12	380	36	83	36	Pink and white.

POTATOES—Test of Varieties—*Continued.*

No.	Name of Variety.	Quality.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Un- marketable.		Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
44	Seattle.....	Medium ..	464	12	356	24	107	48	White.
45	Burnaby Seedling.....	Good.	462	0	418	0	44	0	Pink and white.
46	Early Harvest.....	"	457	36	407	0	50	36	Pink.
47	Thorburn.....	"	457	36	398	12	59	24	Pink and white.
48	Early Sunrise.....	"	457	36	378	24	79	12	Pink.
49	Burpee's Extra Early.....	"	453	12	376	12	77	0	Pink and white.
50	Rose of the North.....	"	453	12	371	48	81	24	Pink.
51	Early Puritan.....	Good.	448	48	391	36	57	12	White.
52	20th Century.....	"	446	36	385	0	61	36	"
53	State of Maine.....	Good..	442	12	396	0	46	12	"
54	Uncle Sam.....	"	442	12	389	24	52	48	"
55	Empire State.....	"	442	12	376	12	66	0	"
56	Dreer's Standard.....	"	440	0	400	24	39	36	"
57	Penn. Manor.....	"	440	0	393	48	46	12	Pink and white.
58	Vick's Extra Early.....	Good.....	440	0	385	0	55	0	"
59	Doherty's Seedling.....	"	437	48	411	24	26	24	White.
60	Holborn Abundance.....	Medium....	437	48	380	36	57	12	"
61	Champion from N.B.....	"	437	48	367	24	70	24	"
62	Early Market	"	435	36	404	48	30	48	Pink.
63	Columbus	"	435	36	385	0	50	36	Pink and white.
64	Wonder of the World.....	Good.....	435	36	323	24	112	12	"
65	New Queen.....	"	431	12	321	12	110	0	"
66	Early Summer.....	"	429	0	323	24	105	36	"
67	Polaris.....	Good.	426	48	398	12	28	36	White.
68	McIntyre	Medium....	426	48	371	48	55	0	White and purple.
69	Gem of Aroostook	Good.....	426	48	368	36	57	12	Pink and white.
70	Prize Taker	"	426	48	365	12	61	36	Pink.
71	Early Michigan.. ..	"	426	48	316	48	110	0	White.
72	Early Rose.....	Good.....	422	24	396	0	26	24	Pink.
73	Dobson's Early.....	"	420	12	385	0	35	12	White.
74	Canadian Beauty.....	Good.....	420	12	356	24	63	48	Pink and white.
75	Burbank's Seedling.....	"	420	12	352	0	68	12	White.
76	American Giant	Medium....	415	48	380	36	35	12	"
77	Seedling No. 7	"	413	36	369	36	44	0	Bright pink.
78	White Beauty	Good.....	413	36	281	36	132	0	White.
79	Chicago Market.....	"	407	0	387	12	19	48	Pink.
80	New Variety No. 1.....	Poor.	404	48	369	36	35	12	White.
81	Seedling No. 230.....	Medium....	404	48	345	24	59	24	White.
82	Rose No. 9.....	"	402	36	363	0	39	36	Pink.
83	Lizzie's Pride.....	Good....	400	24	325	36	74	48	Pink, red eye.
84	Bovee	"	400	24	299	12	101	12	Pink and white.
85	Dooley.....	"	398	12	382	48	15	24	"
86	Harvest King	"	398	12	380	36	17	36	White.
87	Rural Blush No. 2....	Good.....	396	0	380	36	15	24	"
88	Dutch Blue.....	"	396	0	347	36	48	24	Dark purple.
89	White Elephant	"	393	48	360	48	33	0	Pink and white.
90	Everett	Good.	391	36	332	12	59	24	Pink.
91	General Gordon.....	"	389	24	343	12	46	12	"
92	Reading Giant.....	Poor.	389	24	323	24	66	0	"
93	Earliest of All.....	Good.....	385	0	231	0	154	0	Pink and white.
94	Early Pride	"	378	24	341	0	37	24	Pink.
95	Green Mountain.....	"	378	24	272	48	105	36	White.
96	Rural Blush.....	"	376	12	281	36	94	36	Pink.
97	Sir Walter Raleigh	"	374	0	343	12	30	48	White.
98	Bliss' Triumph.....	"	374	0	286	0	88	0	Red.
99	White Giant	"	367	24	334	24	33	0	White.
100	Great Divide.....	Good.	367	24	334	24	33	0	"
101	Clarke's No. 1.....	"	360	48	299	12	61	36	Pink.
102	Early Six Weeks.....	"	358	36	292	36	66	0	"
103	Silver Dollar.....	"	358	36	288	12	70	24	White.
104	Up-to-date.....	"	354	12	261	48	92	24	"
105	Vanier.....	Poor to med.	354	12	242	0	112	12	Red.
106	Pink Eye.....	"	352	0	275	0	77	0	White, bright pink eye.
107	Mills' Prize.....	Good.....	349	48	259	36	90	12	White.

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POTATOES—Test of Varieties—*Concluded.*

No.	Name of Variety.	Quality.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Un- marketable.		Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
108	Beauty of Hebron	Medium...	341	0	272	48	68	12	Pink and white.
109	Pearce's Prize Winner	Good.	334	24	281	36	52	48	Pink.
110	Early Ohio.	"	332	12	266	12	66	0	"
111	Churchill Seedling.....	.....	330	0	281	36	48	24	White.
112	Seedling No. 214.....	Good.	323	24	255	12	68	12	"
113	Maggie Murphy.....	Medium....	321	12	303	36	17	36	Bright pink.
114	Cambridge Russet	Good.....	321	12	294	48	26	24	White.
115	Wall's Orange.....	.....	321	12	281	36	39	36	Yellow, purple eye.
116	Rose of Erin.....	.....	319	0	299	12	19	48	Pale pink, bright pink eye.
117	Early Andes	Good.....	316	48	264	0	52	48	Pink.
118	Early White Prize.....	"	314	36	248	36	66	0	White.
119	Red Rock .....	.....	308	0	237	36	70	24	Red.
120	Pearce's Extra Early	Good.....	305	48	213	24	92	24	Pink.
121	Early Rose.....	"	283	48	213	24	70	24	"
122	Pride of the Market	"	277	12	178	12	99	0	White.
123	Bill Nye. ....	.....	275	0	195	48	79	12	"
124	Livingston's Banner	Good.....	274	48	202	24	70	24	"
125	Early Dawn.....	.....	268	24	228	48	39	36	Pink, brighter at seed end.
126	Brownell's Winner.....	Good.....	266	12	222	12	44	0	Red.
127	Ohio Junior .....	.....	259	36	211	12	48	24	Pink.
128	Vigorosa. ....	.....	250	48	200	12	50	36	Pink and white.
129	Seneca Queen.....	Very good..	250	48	178	12	72	36	Pink and white, bright pink eye.
130	Blue Potato .....	.....	237	36	171	36	66	0	Deep purple.
131	Houlton Rose.....	.....	154	0	123	12	30	48	Pink.

An average yield per acre of 429 bushels.

ADDITIONAL VARIETIES OF POTATOES TESTED IN 1902.

In addition to the varieties of potatoes grown in the uniform test plots, smaller quantities of the following kinds were planted :—

Name of Variety.	Number of Sets Planted.	Total Yield Per Acre.		Yield Per Acre of Market- able.		Yield Per Acre of Unmarket- able.	
		Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Seedling No. 2, D. Murray, N.S.....	15	503	22	387	12	116	10
Kaiser	33	475	12	431	12	44	..
Snowball.....	33	470	48	404	48	66	..
Early Envoy.....	33	435	36	409	12	26	24
Eureka Extra Early.....	33	413	36	343	12	70	24
Northern Beauty.....	33	409	12	299	12	110	..
Seedling No. 1, D. Murray, N.S.....	15	396	53	329	7	67	46
Crimes Lightning.....	33	396	..	365	12	30	48
Pat's Choice.....	33	356	24	330	..	26	24
Pingree.....	33	352	..	312	24	39	36
Van Orman's Earliest.. ..	33	343	12	321	12	22	..
Cyclop	33	330	..	277	12	52	48
King Michigan.....	33	330	..	259	36	70	24
Woltman.. ..	33	316	48	202	24	114	24
Todd's Seedling, W. H. Todd, Ingersoll, Ont.....	33	154	..	123	12	30	48

TWELVE BEST YIELDING POTATOES—AVERAGE OF THREE TO EIGHT YEARS' TESTS.

Name of Variety.	Average Yield per Acre.		Name of Variety.	Average Yield per Acre.	
	Bush.	Lbs.		Bush.	Lbs.
1. Swiss Snowflake, 3 yrs.....	452	28	7. McIntyre, 3 yrs.....	409	12
2. Late Puritan, 8 yrs.....	431	59	8. Country Gentleman, 4 yrs.	403	4
3. American Wonder, 8 yrs.....	430	29	9. Uncle Sam, 5 yrs.....	402	36
4. Seattle, 8 yrs.....	428	8	10. Flemish Beauty, 8 yrs	397	56
5. Holborn Abundance, 8 yrs....	426	28	11. Burnaby Seedling, 8 yrs.....	391	49
6. Penn. Manor, 4 yrs.....	411	24	12. Reeves' Rose, 6 yrs.	391	5

An average crop of 414 bushels 43 lbs. per acre.

The above table was taken from Bulletin 41, prepared by Dr. Wm. Saunders.

POTATOES PLANTED AT DIFFERENT DATES.

In 1898, an experiment was begun in planting potatoes at different dates, beginning when the main crop was put in and continuing at intervals of two weeks until August 23, 1898, July 23, 1899; July 21, 1900; July 11, 1901, and July 24, 1902. An early and a late variety were used each year, the varieties being Early Norther and Irish Daisy, in 1898, Early Norther and Rural Blush, in 1899; Early Norther and Sir Walter Raleigh, in 1900; Early St. George and Rural No. 2, in 1901, and Everett and Carman No. 1, in 1902. In 1902, two plantings were made before the main crop was put in, the yields from the planting made on May 15, being the best of the series. This experiment proves that as far north as Ottawa a fairly good crop of marketable potatoes can be obtained by planting as late as July 10, when they might succeed an early crop, such as garden pease. The vines in this test were not sprayed with Bordeaux mixture this year.

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Date of planting.	Total yield per acre 1898.		Total yield per acre, 1899.		Total yield per acre, 1900.		Total yield per acre, 1901.		Total yield per acre, 1902.		Total average yield per acre, 1898-2.		Average yield per acre mar- ketable, 1898-2		Average yield per acre Un- marketable 1898-1902.	
<i>Early variety.</i>	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
1st early planting, May 1, 1902..	.....	.....	.....	.....	.....	.....	.....	.....	268	24	.....	.....	.....	.....	.....	.....
2nd early planting, May 15, 1902	.....	.....	.....	.....	.....	.....	.....	.....	294	48	.....	.....	.....	.....	.....	.....
1st planting, May 26, 1898; May 26, 1899; May 26, 1900; May 30, 1901; May 29, 1902.....	277	12	505	47	409	12	374	.....	217	48	356	48	306	25	50	23
2nd planting, June 10, 1898; June 9, 1899; June 9, 1900; June 13, 1901 June 12, 1902.	160	36	459	48	453	12	299	12	217	48	318	7	254	8	63	59
3rd planting, June 24, 1898; June 23, 1899; June 23, 1900; June 27, 1901; June 26, 1902.....	125	24	237	10	365	12	246	24	140	48	222	59	174	25	48	34
4th planting, July 8, 1898; July 7, 1899; July 7, 1900; July 11, 1901; July 10, 1902.....	30	48	9	41	268	24	74	48	136	24	104	1	72	10	31	51
5th planting, July 23, 1898; July 21, 1899; July 21, 1900; July 24, 1902.....	1	6	.....	.....	26	24	.....	.....	77	.....	.....	.....	.....	.....	.....	.....
6th planting, Aug. 9, 1898.....	No yield		.....		.....		.....		.....		.....		.....		.....
7th planting, Aug. 23, 1898.....																
<i>Late variety.</i>																
Planted on same dates as early variety—																
1st early planting. ....	.....	.....	.....	.....	.....	.....	.....	.....	378	24	.....	.....	.....	.....	.....	.....
2nd " .....	.....	.....	.....	.....	.....	.....	.....	.....	459	48	.....	.....	.....	.....	.....	.....
1st planting	259	36	338	48	277	12	501	36	411	24	357	43	314	20	43	23
2nd "	173	48	164	34	338	48	404	48	281	36	272	42	220	37	52	5
3rd "	68	12	157	18	198	.....	325	36	206	48	191	10	163	2	28	8
4th "	8	48	19	22	202	24	57	12	233	12	104	11	64	14	39	57
5th "	1	6	.....	.....	26	24	.....	.....	118	48	.....	.....	.....	.....	.....	.....
6th "	No yield		.....		.....		.....		.....		.....		.....		.....
7th "																

AVERAGE RESULTS FROM OTHER EXPERIMENTS WITH POTATOES.

Planting at different distances apart:—A test of seven years has proven that the best results are obtained in sandy loam soil from planting in rows 2½ feet apart with the sets 14 inches apart in the rows.

Planting at different depths:—For six consecutive years the highest yields of potatoes have been obtained in sandy loam soil from planting the sets only 1 inch deep. Planting from 4 to 5 inches deep is, however, recommended for field culture.

Different kinds of sets:—The highest yields have been obtained from large, whole potatoes, but the best and most economical method is to cut medium to large potatoes into sets having at least 3 eyes with a good amount of flesh. The results vary with different varieties.

SPRAYING POTATOES.

It is surprising that more farmers do not spray their potatoes with Bordeaux mixture to prevent blight and rot. For years the Central Experimental Farm has been recommending it, and it has been shown that the yields were more than one-third greater when the potatoes were thoroughly sprayed, and this year the yields in some cases were doubled.

A material known as Bug Death was compared this year with poisoned Bordeaux mixture in an experiment to prevent blight and rot, and to kill the Colorado potato beetle.

In the pamphlet on Bug Death, published by the Bug Death Chemical Company, it is claimed that this material, Bug Death, 'kills the bugs, feeds the plants, and increases the yield.' The object was to find out whether this statement was correct, and to learn if Bug Death could be applied economically in preference to Paris green and Bordeaux mixture.

On May 28 two rows each, of eleven varieties of potatoes, were planted in as uniform soil as possible. The rows were divided into three equal parts, making the three plots one-thirty-sixth of an acre each.

At the Experimental Farm it is not the custom to spray for the potato beetle until the young are hatched. The first spraying was not, therefore, made until July 10, at which time the larvæ were very numerous and the plants large and vigorous.

It is recommended by the Bug Death Company to apply Bug Death dry at the rate of $12\frac{1}{2}$ pounds or more per acre from three to five times. In order to test its value as plant food it was applied the first time at the rate of 144 lbs. to the acre. The plants which were large were gone over twice, in order that the surface of the leaves should be entirely covered with the Bug Death. At the next three applications, namely, on July 22, July 30 and August 13, the Bug Death was sprayed on the vines; the formula used being 1 lb. to 3 gallons of water, as recommended by the company. It was found that 3 gallons of the mixture covered the vines nicely. This was at the rate of 108 gallons per acre, or 36 lbs. of Bug Death. The amount of liquid used was by no means excessive, as 190 gallons per acre of Bordeaux mixture were used at each spraying in the experiment, and in field work 120 to 150 gallons per acre has been applied. Where Paris green and water alone were used the mixture was sprayed on at the rate of 130 gallons per acre.

The following is a statement of the results, and also of the comparisons with other mixtures used:—

Formula 1.—Bug Death, applied dry, July 10, 1902. Applied at the rate of 144 lbs. per acre.

Result as an Insecticide.—Practically all beetles were killed.

Formula 1a.—Bug Death, mixed with water in the proportion of 1 lb. of Bug Death to 3 gallons water. Sprayed on vines July 22, July 30, August 13, each time at the rate of 36 lbs. per acre. Total, 108 lbs. per acre.

Result as an Insecticide.—Killed practically all the beetles.

Result as a Fungicide.—Plants remained green longer and yield was larger than where sprayed with Paris green alone, which is an insecticide only, but plants were not as long green, nor the yield as heavy, as where sprayed with Bordeaux mixture.

Formula 2.—Paris green, 8 ounces to 40 gallons of water. Sprayed on vines July 10, July 22 and July 30, each time at the rate of 2 lbs. 4 ounces per acre. Total, 6 lbs. 12 ounces per acre.

Result of spraying July 10.—Only a few bugs left, but more than where Bug Death was used at the rate of 144 lbs. per acre.

Formula 3.—6 lbs. bluestone, 4 lbs. lime, 8 oz. Paris green, 40 gallons water, the ordinary formula for potato blight. Sprayed on vines July 10, July 22, July 30, August 13, each time at the rate of $28\frac{1}{2}$ lbs. bluestone and 2 lbs. 6 oz. Paris green per acre. Total, 114 lbs. bluestone and 9 lbs. 8 oz. Paris green per acre.

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SPRAYING WITH BORDEAUX MIXTURE AND BUG DEATH TO PREVENT BLIGHT AND ROT.

Name of Variety.	Plants dead where sprayed with Bordeaux mix- ture.		Plants dead where sprayed with Bug Death.		Plants dead where unsprayed.		Yield per acre mar- ketable potatoes. — Bordeaux mixture.		Yield per acre mar- ketable potatoes. — Bug Death.		Yield per acre mar- ketable potatoes. — Unsprayed.		Yield per acre rot- ten potatoes. — Bordeaux mixture.		Yield per acre rot- ten potatoes. — Bug Death.		Yield per acre rot- ten potatoes. — Unsprayed.	
							Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Jubilee	Sept.	30	Sept.	16	Sept.	10	379	30	339	54	214	30	9	54	72	36	95	42
Carman No. 3.....	"	22	"	13	"	4	376	12	247	30	224	24	.....	13	12	23	6	
Bliss Triumph.....	"	13	"	7	"	4	359	42	316	48	300	18	.....	3	18	19	48	
Early Ohio.	"	22	"	13	"	4	349	48	174	54	148	30	29	42	52	48	56	6
Holborn Abundance....	Oct.	2	"	20	"	16	346	30	349	48	290	24	59	24	62	42	62	24
Great Divide.....	Sept.	21	"	13	"	4	339	54	277	12	174	54	.....	33	..	23	6	
Empire State	"	29	"	15	"	10	297	..	231	..	132	..	13	12	16	30	42	54
Livingston's Banner	Oct.	1	"	10	"	9	280	30	171	36	141	54	3	18	6	36	23	6
Polaris.	Sept.	19	"	10	"	4	264	..	178	12	165	..	19	48	42	54	16	30
Vigorosa	"	20	"	13	"	5	217	48	201	18	151	48	33	..	52	48	16	30
McIntyre	Oct.	1	"	16	"	13	201	18	273	54	145	12	.....	.....	.....	.....	.....	.....
Average	Sept.	25	Sept.	13	Sept.	7	310	12	251	6	189	54	15	18	32	24	34	28

COST OF MATERIALS.

Formula 1 : Bug Death, dry, at the rate of 144 lbs per acre.

144 lbs. at 8c. per lb..... \$11 52

Formula 1a : Bug Death, 1 lb. to 3 gallons water.

108 lbs. (3 applications) at 8c. per lb..... 8 64

Total cost \$20 16

Yield per acre : 251 bush. 6 lbs.

Formula 2 : Paris green, 8 oz. to 40 gallons water.

6 lbs. 12 oz. (3 applications) at 20c. lb..... \$ 1 35

Yield per acre : 189 bush. 54 lbs.

Formula 3 : Bluestone, 6 lbs.; lime, 4 lbs.; Paris green, 8 oz.; water, 40 gallons.

114 lbs. bluestone at 7c. per lb..... \$ 7 98

9 lbs. 8 oz. Paris green at 20c. lb. 1 90

Total cost \$ 9 88

Yield per acre : 310 bush. 12 lbs.

COMPARISON OF COST OF MATERIAL AND YIELDS PER ACRE.

Formula.	Cost of material. Per acre.		Yield per acre. Average of 11 Varieties.	
Paris green.....	\$ 1	35	189 bush.	54 lbs.
Bug Death.....	20	16	251 "	6 "
Bordeaux mixture and Paris green	9	88	310 "	12 "

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It may be urged that the quantities of Bug Death used in the above test were altogether excessive. Let us then presume that the amount recommended by the company in its circular, namely, $12\frac{1}{2}$ lbs. per acre, applied from 3 to 5 times, is sufficient to destroy the bugs, and let us further grant that with this lesser quantity the yield would be equal to that obtained in our experiment, we have, taking 50 lbs. per acre as the amount applied, ($12\frac{1}{2}$ lbs. four times) the following comparative figures:—

Paris green.....	\$1 35 per acre.
Bug Death.....	4 00 "
Bordeaux mixture and Paris green.....	9 88 "

Difference in cost in favour of Bug Death: \$5.88. There was, however, a difference in yield per acre of 59 bush. 6 lbs. in favour of Bordeaux mixture and Paris green. At 40c. a bushel, a fair price at the present time, this difference in yield would mean \$23.64, or a net difference in favour of Bordeaux mixture and Paris green of \$17.76 per acre.

OBSERVATIONS AND CONCLUSIONS.

As a fungicide, Bug Death is not as economical to use as Bordeaux mixture. As an insecticide and fungicide combined, it can probably be used more profitably than Paris green alone, which is an insecticide only, as there is a difference of 61 bush. 12 lbs. per acre in favour of Bug Death as compared with Paris green alone.

Bug Death cannot, however, be used as economically as Bordeaux mixture and Paris green combined.

Nine varieties out of the eleven in the test, yielded more per acre where Bordeaux mixture was used than where Bug Death was applied. In two varieties the yield from Bug Death was greater.

There was no evidence from this year's experiments to show that Bug Death is a plant food. The vines were no more vigorous than where Bordeaux mixture and Paris green were used together.

Bug Death adheres well to the foliage.

TOMATOES—TEST OF VARIETIES.

As the tomato is one of the most popular of vegetables, the different varieties which are offered for sale have been given a thorough trial. Many of the varieties have been tested for seven years and the average results, which each year become more valuable, are given in the following tables. The earliest varieties of tomatoes are the most profitable, and as many early kinds as possible have been obtained. For three years the Sparks Earliana has been tested and this is considered the best early tomato grown here, as it is very early, of good size, and quite smooth. The Early Richmond and Extra Early Jersey tomatoes have been discarded, although they were very productive sorts, but as they were wrinkled kinds and resembled the Early Bermuda very closely it was thought best to discontinue them. Other poorer sorts were also discarded this year.

The seed of the tomatoes grown this year was sown in hot beds on April 3; the young plants were pricked out into strawberry boxes on April 25, and planted in the open ground on June 2. They were placed 4 feet apart each way, and five plants of each variety were used. The soil was a light sandy loam where corn had been grown the previous year, the corn having been well manured. The soil was kept cultivated until the growth of the plants prevented it. The vines were spread out to admit sunshine, but not trained or pruned in any way. The early part of the season was not favourable to the ripening of the fruit, but by the end of the season a good crop of ripe fruit had been produced. Ninety three varieties were tested this year.

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TOMATOES TWELVE BEST YIELDING VARIETIES, 1902.

Name of Variety.	Date of first ripe fruit.	Yield of ripe fruit, first three pickings.	Yield of ripe fruit, balance pickings.	Total yield of ripe fruit, all pickings.	Total yield of ripe fruit, per plant.	Remarks.
		Lbs. oz.	Lbs. oz.	Lbs. oz.	Lbs. oz.	
1 Dominion Day.....	July 30.	2 10	137 6	140	28	Large, wrinkled, scarlet.
2 Early Leader.....	" 31.	8 12	129 12	138 8	27 11	Below medium, half wrinkled, scarlet.
3 Earliest of All.....	Aug. 6.	2 4	115 14	118 2	23 10	Medium, half wrinkled, scarlet.
4 Conqueror.....	July 31.	3 2	113	116 2	23 4	Medium, wrinkled to smooth, scarlet.
5 Maule's Earliest..	Aug. 4.	12	109	109 12	21 15	Large, wrinkled, scarlet.
6 Thorburn's Earliest....	" 4.	2	106	108	21 10	Above medium, wrinkled, scarlet.
7 Canada Victor.....	" 12.	4	105 4	105 8	21 2	Medium, wrinkled to smooth, scarlet.
8 Quicksure.....	" 7.	1 6	103 12	105 2	21	Medium, almost smooth, scarlet.
9 Bond's Early Minnesota	" 7.	8	104	104 8	20 14	Below medium to medium, smooth purplish pink.
10 Atlantic Prize.....	July 30.	2 8	101 15	104 7	20 14	Medium, almost smooth, scarlet.
11 Bright and Early	Aug. 7.	1	102 12	103 12	20 12	Below medium, smooth, scarlet.
12 Early Ruby.....	July 29.	2 12	95 10	98 6	19 11	Medium, half wrinkled to smooth, scarlet.

TOMATOES—SIX EARLIEST VARIETIES, 1902.

Early Leader.....	July 31.	8 12	129 12	138 8	27 11	Below medium, half wrinkled, scarlet.
Early Ruby.....	" 29.	2 12	95 10	98 6	19 11	Medium, half wrinkled to smooth, scarlet.
Dominion Day.....	" 30.	2 10	137 6	140	28	Large, wrinkled, scarlet.
Atlantic Prize	" 30.	2 8	101 15	104 7	20 14	Medium, almost smooth, scarlet.
Extra Early Red.....	" 30.	1 6	93 12	95 2	19	Below medium, smooth, scarlet.
Spark's Earliana.....	" 29.	6	77	77 6	15 8	Medium, smooth, scarlet.

SIX BEST YIELDING WRINKLED VARIETIES—AVERAGE FOR FIVE YEARS OR MORE.

Name of Variety.	No. of Years.	Average date of first ripe fruit.	Average yield per plant.	Remarks.
			Lbs. oz.	
1 Early Bermuda.....	7	Aug. 6...	17	Medium, wrinkled, scarlet.
2 Canada Victor.....	7	" 6...	16 2	Medium, wrinkled to smooth scarlet.
3 Money Maker....	7	" 4...	16 1	Medium to above medium, wrinkled, scarlet.
4 Conqueror.....	7	" 2...	15 5	Medium, wrinkled to smooth, scarlet.
5 Democrat.....	7	" 9...	13 8	Medium, wrinkled, purplish pink.
6 Boston Market.....	5	" 7...	13 7	Large, wrinkled, scarlet.

TWELVE BEST YIELDING SMOOTH VARIETIES—AVERAGE FOR FIVE YEARS OR MORE.

1 Bright and Early	6	Aug. 9...	17	1	Below medium, smooth, scarlet.
2 Baltimore Prize Taker..	7	" 10...	16	4	Medium to above medium, smooth, purplish pink.
3 Bond's Early Minnesota	7	" 2...	15	14	Medium to below medium, smooth, purplish pink.
4 Early Ruby.....	7	July 31...	15	3	Medium, half wrinkled to smooth, scarlet.
5 Extra Early Advance ..	7	Aug. 6...	15	1	Below medium, smooth, scarlet.
6 Essex Hybrid.....	7	" 8...	14	12	Medium to above medium, smooth purplish pink.
7 Freedom	5	" 6...	14	11	Medium to below medium, smooth, scarlet.
8 Atlantic Prize..	7	" 4...	14	1	Medium, almost smooth, scarlet.
9 Comrade.....	7	" 6...	13	15	Medium to below medium, smooth, scarlet.
10 Brinton's Best.....	7	" 15...	13	10	Above medium to large, smooth, scarlet.
11 Liberty Bell.....	6	" 8...	13	9	Large, smooth, scarlet.
12 Trophy.....	7	" 12...	13	6	Above medium to large, smooth, scarlet.

PEASE—EXPERIMENTS FOR COMPARISON OF YIELDS AND QUALITY.

For the past five years a large number of garden pease have been tested in the horticultural department and notes taken on their earliness, productiveness and quality, the length of vines being also ascertained. For the past three years a number of varieties which were considered the most promising from the standpoint of yield and quality have been grown on larger plots, in order to learn which were the best and most productive. Some of those tried in 1900 have been discarded, while other new ones are being tried. Twelve hundred selected pease of most of the varieties were sown in drills 100 feet long and 2½ feet apart on May 5 of this year. The pease germinated well and there was a good stand. As each variety became ready for use, the date was recorded and the yields of green pods from the several pickings entered.

In the following table the average results for the three years are given :—

PEASE—TEST OF VARIETIES.

Name of Variety.	Ready for use, 1902.	Average Date ready for use, 1900-2.	Number of Pick- ings, 1902.	Yield of Green Pods, 100 feet, 1902.	Average Yield of Green Pods 100 ft., 1900-2.	Average length of Vine, 1902.	Quality.
				Quarts.	Quarts.	In.	
Early—							
Exonian.....	July 6..	July 6..	3	66	38½	37	Good.
Child's Morning Star.....	" 6..	" 4..	3	60	34½	28	Very good.
American Wonder.....	" 10..	" 7..	3	50	34½	26	"
Gregory's Surprise.....	" 6..	" 2..	3	44	31½	31	"
Nott's Excelsior.....	" 10..	" 6..	3	45	29½	18	"
Excelsior.....	" 9..	.....	2	52	.....	24	"
Second Early—							
Gradus.....	" 10..	July 8..	2	72	43½	31	"
Nott's New Perfection.....	" 14..	" 11..	3	64	43½	.....	"
Chelsea.....	" 12..	" 8..	3	66	42½	26	"
English Wonder.....	" 14..	" 11..	2	68	41½	26	Good.
Premium Gem.....	" 14..	" 8..	3	40	36½	36	Very good.
Medium—							
Burpee's Quantity.....	" 17..	" 15..	3	70	51½	36	Good.
McLean's Little Gem.....	" 16..	" 14..	3	74	50½	37	Very good.
McLean's Advancer.....	" 16..	" 14..	4	72	48½	40	"
Heroine (2 years).....	" 24..	" 20..	2	68	43½	30	"
Telephone.....	" 19..	.....	3	86	.....	54	"
Late—							
McLean's Prolific.....	" 24..	July 22..	3	116	67½	43	Good.
Champion of England.....	" 21..	" 21..	3	94	64½	85	Very good.
Boston Wrinkled.....	" 21..	" 20..	2	82	60½	49	Good.
Eugenie.....	" 22..	" 21..	2	81	53½	55	"
Yorkshire Hero.....	" 26..	" 21..	2	56	39½	46	Very good.
Juno.....	" 26..	" 23..	2	50	37½	30	Good,
Veitch's Perfection.....	" 28..	" 26..	2	48	36½	69	"
Stratagem Improved.....	" 26..	" 22..	2	58	36½	.....	Very good.

FOREST BELTS.

In the Annual Report for 1901, a description was given of the Forest Belts at the Central Experimental Farm, the objects for which they were planted, and also a table giving particulars regarding the time of planting and present height and diameter of the more important timber trees. Space will not permit of republishing the table with this year's records.

Owing to the favourable season the trees grew well this year. As usual, measurements were taken of the height and diameter of average marked trees in the belts. No

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planting was done this year. In the mixed belts it was necessary to go through with a hook and cut back the tops of the stronger growing trees of inferior value, in order that the leaders of the better kinds could predominate, as if left the valuable trees would have in many cases been crowded out. The evergreen plantation was also thinned out as much as the trees could stand without breaking the leafy canopy, and the dead wood removed. The pines in this plantation are doing very well and are tall and straight. The trees removed made very good poles.

ARBORETUM AND BOTANIC GARDEN.

The trees, shrubs, and herbaceous plants made very satisfactory growth in the Arboretum and Botanic Garden this year, there being less injury from winter than usual and the growing season very favourable. The Arboretum is now all seeded down to lawn grass with the exception of about two acres occupied by the nursery of the Ottawa Improvement Commission, and the grass, which was kept regularly cut all summer, looked well. A large number of additions were made this year to the collection of both woody and herbaceous plants. The following figures show how rapidly the number of species and varieties under test have increased. In 1889, 200 species and varieties of trees and shrubs were set out, and by the autumn of 1894 about 600 were being tested. Up to the autumn of 1901, there had been 3,728 species and varieties of trees grown, of which 2,871 were living, comprised of 185 genera, represented by about 4,500 specimens.

Of herbaceous perennials there were 1,605 species and varieties living in the autumn of 1902.

Canadian trees and shrubs have been thoroughly tested, and are well represented. All of the trees mentioned in Prof. John Macoun's paper on the 'The Forests of Canada and their distribution' have been tried, with the exception of a few Western species which have not been given a thorough trial as yet. Among these are *Salix scouleriana*, Baratt; *Pinus flexilis*, James; *Pinus albicaulis*, Eng.; *Pinus monticola*, Dougl.; *Tsuga pattoniana*, Eng.; *Tsuga mertensiana*, Carr; *Abies grandis*, Lindl.; *Abies amabilis*, Forbes.

Of Canadian trees which have been thoroughly tested the following have not proven hardy :—

Asimina triloba, Duval (Papaw). This has killed out root and branch.

Liriodendron tulipifera, Linn. (Tulip-tree). The Tulip-tree killed to near the ground every winter until last winter when it was hardier. A variety of this species, however, *integrifolia*, imported from Berlin, Germany, in 1897, has proven hardy for the past four years.

Cercis canadensis, Linn. (Judas-tree or American Red-bud).—The tree now living in the Arboretum was planted in the autumn of 1896. That winter it killed to the ground and only made weak growth in 1897; the next winter it killed back two-thirds; the third, one-half; the fourth winter it was almost hardy to the tips, and it was also the same the last two winters. This is a good example of the acclimatization of trees.

Cornus florida, Linn. (Flowering Dogwood).—One specimen of this tree was practically hardy from 1897 until two years ago when it killed to near the ground. Other specimens were not as hardy.

Nyssa sylvatica, Marsh (Sour Gum).—The tree now living was planted in the spring of 1897; the first winter it killed back one-half; the next, one-half; the third, it was hardy nearly to the tips, and again the same the last two winters.

Sassafras officinale, Nees (Sassafras).—This has killed out root and branch thus far, though it has not been as thoroughly tested as some of the others.

The following other trees peculiar to South-western Ontario, appear to be hardier than the above, and some individual trees are perfectly hardy :—

Platanus occidentalis, Linn. (Buttonwood).

Castanea sativa, Mill. var. *Americana* (Chestnut).

Fraxinus quadrangulata, Michx. (Blue Ash).

Gleditschia triacanthos, Linn. (Honey Locust).

Some of the rest, such as *Gymnocladus canadensis*, *Crataegus Crus-galli*, *Pyrus coronaria*, and *Juglans nigra*, are quite hardy.

A few of the coast trees of British Columbia kill out root and branch, among such being *Acer macrophyllum*, *Arbutus Menziesii*, *Cornus Nuttallii*, and *Quercus garrayana*.

It is interesting to note that out of the list of 121 species of native trees published by Prof. J. Macoun, about 100 have proven hardy or half hardy here, and the writer has no doubt that when all the species are tested there will not be more than 10 which cannot be grown at Ottawa.

The question of the acclimatization of trees, shrubs and plants is a very important one, and one in which there is a good field for work at the Central Experimental Farm. A few instances have been mentioned where native trees have gradually become hardier after being planted several years. It might have been further stated that other specimens of these had been killed out root and branch. These furnish excellent examples of the individuality of trees. We have noticed over and over again in nursery rows that some trees of the same species are hardier and more vigorous than others. It has also been noticed that a tree which has a wide range from north to south, will not be as hardy when imported from the south as from the north. An excellent example is the red maple, *Acer rubrum*. This tree imported from some parts of the United States has killed back and made scrubby trees, while from further north it has done well.

There is no doubt, in the writer's opinion, that many trees which we have great difficulty in getting to fruit here, will eventually be much hardier when raised from seed ripened at Ottawa.

Contributions of plants and seeds, especially of rare Canadian species, will be gratefully received, as the desire is to increase the collection as rapidly as possible and to have the native flora well represented.

In the report for 1897, a descriptive list of 100 of the best herbaceous perennials was published and since then additional short lists have been given in the annual reports.

During the past two years the writer has had the opportunity of visiting many gardens and the great dearth of herbaceous perennials has been very apparent. This was most noticeable in the early part of the season.

The following list of the best herbaceous perennials which bloom at Ottawa before May 31, has been prepared in the hope that it may prove of assistance to lovers of flowers in helping them to make a good selection of plants, some of which will begin to bloom almost as soon as the snow is off the ground. Spring flowering bulbs are very desirable, but they should be supplemented by other plants. As there are not many who would desire to get all the kinds described, the best twenty-five are marked with an asterisk. In the following list the species and varieties are given in order of blooming.

LIST OF BEST SPRING-FLOWERING PERENNIALS.

* *Anemone patens*. Spreading pasque flower, (North America).—Height 6 to 9 inches. In bloom fourth week of April. Flowers large and pale purple. Very early. A beautiful flower.

Arabis albida. Mountain rock cress. (Caucasus).—Height 6 to 9 inches. In bloom first week of May. Flowers small but pure white and borne profusely in racemes or clusters.

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Arabis alpina. White Alyssum. (Europe, North America).—Height 6 inches. Somewhat like the last, but with smaller flowers. This is very subject to attacks from the flea beetle, which destroys the leaves and buds.

* *Adonis vernalis*, Ox-eye. (Europe).—Height 6 to 9 inches. In bloom first week of May. Flowers large, lemon-yellow, borne singly on the ends of the stems. A very beautiful early flowering perennial.

Vinca minor. Periwinkle. (Europe).—Height 6 to 9 inches. Begins to bloom first week of May. Flowers a charming shade of bright blue. This pretty evergreen perennial succeeds well in shady places. The prostrate stems take root and it spreads rapidly.

Saxifraga (Megasea) cordifolia. (Siberia).—Height 1 foot. Blooms in first week of May. Flowers bright pink in a close panicle and on a heavy stem. This is an attractive plant with large shiny, evergreen foliage. Looks better in a clump than grown as a single plant. *S. Schmidtii* is also good.

Viola odorata. English Violet (Europe, Great Britain).—Although not perfectly hardy, the single sweet scented or English violet can be grown successfully with a little care. It should be planted in a partially shady place, preferably with a Northern exposure and protected in winter with evergreen boughs, which should be gradually removed in the spring in order to give the plants a chance to harden off. The double varieties are tenderer, but one known as Hardy Russian appears to be hardier than other double kinds.

* *Mertensia virginica*. Virginian Cowslip. (Western Ontario, United States).—Height 12 to 18 inches. Blooms early in May. Flowers delicate gentian blue, changing to pink, and borne in long pendulous cymes. Leaves of an attractive shade of green. A very attractive plant. Not thoroughly tested at Ottawa yet but hardy as far north as Wisconsin.

Corydalis nobilis. (Siberia).—Height 9 inches. In bloom first week of May. Flowers yellow tipped with green, and finely cut, fern-like foliage. A pretty and striking species in early spring.

Pulmonaria mollis (maculata). Lungwort. (Siberia).—Height 1 foot. In bloom first week of May. This is closely related to *Mertensia virginica*. Flowers blue and borne in graceful racemes. The leaves are mottled, which give this plant a very striking appearance.

* *Phlox subulata* Moss Pink. (Western Ontario, Eastern States).—Begins to bloom in second week of May. There are many varieties of this charming little plant, the flowers of which vary in colour from white to deep pink and are produced in great profusion. The variety *atropurpurea* has proven one of the hardiest and best.

Polemonium humile pulchellum. Dwarf Jacob's Ladder. (Rocky Mountains).—Height 6 to 9 inches. In bloom second week of May. Flowers small, blue, in drooping panicles. This plant has finely cut foliage which helps to make it attractive.

Doronicum caucasicum. Caucasian leopard's-bane. (Europe).—Height 1 foot. In bloom second week of May. Flowers large, yellow and borne singly. A good early perennial.

* *Epimedium rubrum*. Red-flowered barrenwort. (Japan).—Height 1 foot. Blooms in second week of May. Flowers small, bright crimson and white, borne in a loose panicle. A very dainty and beautiful little flower. This and the next two should be in every collection. Both flowers and leaves are ornamental.

* *Epimedium pinnatum (sulfureum)*. Yellow flowered barrenwort. (Persia).—Height 8 to 12 inches. In bloom second week of May. Flowers bright yellow, borne

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in a loose panicle. This species and *E. rubrum* make a charming contrast when planted together. One of the best early flowering perennials. *E. niveum* is a white-flowered species, which is not a very robust grower.

* *Epimedium macranthum*. Large flowered barrenwort. (Japan).—Height 12 to 15 inches. Blooms during second week of May. Flowers bright red, violet and white with conspicuous spurs, making a very pleasing combination of colour. There are several good varieties of this species.

* *Papaver nudicaule*. Iceland Poppy. (Mountains and Arctic regions of Northern Hemisphere).—Height 1 foot. Begins to bloom second week of May. Flowers medium size, yellow, white, or orange. This is a very useful and pretty poppy, blooming freely until July and again in the autumn. Grows rapidly from seed.

Primula officinalis (veris). Polyanthus Primrose. (Europe, Great Britain).—Height 6 to 9 inches. In bloom second week in May. Flowers bright yellow. There is a strain of this old favourite known in the trade as the 'Hardy Primrose' or 'Harry Mitchell' which has proven perfectly hardy at Ottawa. Originated by H. Mitchell, Port Hope, Ont.

Orobis vernus. Spring-flowering bitter vetch. (Europe). Height 1 foot. In bloom second week of May. Flowers reddish-purple, pea-shaped, attractive. A good early flowering perennial.

* *Aquilegia oxysepala*. Russian Columbine. (Northern Asia).—Height 1 foot. In bloom second and third week of May. Flowers large, deep purplish-blue with blue and yellow centres. A very desirable early species and one of the best spring perennials. Being earlier than most other species, it does not hybridize, and thus remains pure.

* *Polemonium Richardsoni*. Richardson's Jacob's Ladder. (Rocky Mountains).—Height 6 to 9 inches. In bloom second and third week of May. Flowers of a fine shade of blue with yellow centres and larger than other species. Very desirable.

* *Phlox amoena*. Lovely Phlox. (Virginia).—Height 6 inches. In bloom second week in May. Flowers medium size, bright pink, in compact clusters. A fine early species.

Aquilegia glandulosa.—Altaian columbine. (Siberia).—Height 1 foot. In bloom third week of May. Flowers large, azure blue, with white centres and short spurs. A fine species. Should be treated as a biennial, as it is likely to kill out after the second season.

Aquilegia Stuarti. Stuart's Columbine.—Height 9 to 12 inches. A hybrid species. Flowers large, rich, deep blue with white centres. Finer than *A. glandulosa*. This also should be treated as a biennial, as it is not to be relied on after the second season.

* *Macrotomia (Arnebia) echioides*. Prophet Flower. (Armenia).—Height 9 inches. In bloom third week of May. Flowers borne in clusters, rich yellow with five black spots on the petals which gradually fade away leaving them all yellow. A very pretty plant.

* *Dicentra spectabilis*. Bleeding Heart. (Siberia and Japan).—Height 3 feet. Blooms during latter half of May. Flowers heart-shaped, red and white, borne in pendulous racemes. An old favourite.

* *Doronicum plantagineum excelsum*. Tall plantain-like leopard's bane. (Great Britain).—Height 2 feet. In bloom third week of May. Flowers large and deep yellow. Good for cutting. A fine plant and very desirable.

Iris pumila. Crimean Iris. (Europe, Asia Minor).—Height 4 to 5 inches. This little iris, with its purple flowers, is well known, being found in many old gardens. It is very hardy and blooms during the second and third weeks of May. There are several

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varieties, among the best of which is *coerulea*. There are now some good hybrids between this and other species which bloom early, have a wider range of colour, and should prove very desirable.

* *Trollius*, Orange Globe. Globe Flower.—Height $1\frac{1}{2}$ to 2 feet. In bloom third and fourth weeks of May. Flowers large, double rich golden yellow. A very desirable plant. Other Globe flowers which are very good are *Trollius asiaticus*, with large orange flowers, and *T. europaeus* and *T. europaeus giganteus* with paler yellow blossoms.

* *Iberis sempervirens*. Evergreen Candytuft. (South Europe).—Height 9 to 12 inches. Begins to bloom in third week of May. Flowers pure white; foliage evergreen. This is really an evergreen shrub, but can be treated as a herbaceous perennial. It is quite hardy and desirable. The variety *garrexiana* is also good and blooms about the same time.

* *Mysotis alpestris*. Alpine Forget-me-not. (Mountains of Europe, Great Britain).—Height 4 to 6 inches. Begins to bloom in third week of May. This popular flower needs no description. It should be in every garden.

Phlox divaricata. Blue Phlox. (Ontario, United States).—Height 9 to 14 inches. Begins to bloom in third week of May. Flowers pale bluish lilac. A free bloomer, continuing to flower for a considerable time.

Iris cristata. Crested Iris. (North Carolina).—Quite dwarf, 3 to 6 inches in height. It blooms the third and fourth weeks of May. A very dainty little species with light blue and yellow flowers. Fine in masses.

Primula Sieboldi. Japanese Primrose. (Japan).—Height 9 inches. Begins to bloom third week of May. This is a very pretty primrose and one not generally known. The flowers are of good size with fringed petals and range in colour from pure white to crimson, according to variety. This primula should not be planted in exposed places, as it is liable under such conditions to kill out.

Aquilegia canadensis. Wild Columbine. (Eastern Canada, United States).—Height 1 to 2 feet. Begins to bloom in third week of May and continues for some time. This beautiful and graceful wild plant, which succeeds well under cultivation, is not planted as extensively as it deserves. The flowers are red with yellow centres and are quite attractive and freely produced. The foliage, also, is attractive.

Polemonium reptans. Greek Valerian. (United States).—Height 6 to 10 inches. Begins to bloom during third week of May and continues for some time. Flowers numerous, blue, and borne profusely in loose clusters.

* *Anemone sylvestris*. Snowdrop windflower. (Europe).—Height 12 to 18 inches. Begins to bloom third week in May and continues for some time. A beautiful large, pure white-flowered species with long stems. Succeeds best where there is plenty of moisture.

* *Phlox reptans*. Creeping Phlox. (United States).—Height 4 to 6 inches. In bloom fourth week of May and later. Flowers medium size, rosy pink with a shade of lilac. A very pretty species.

* *Convallaria majalis*. Lily of the Valley. (Europe, North Asia).—Height 6 inches. Blooms during the fourth week of May. This beautiful flower should be in every garden, but should be planted by itself in a partially shaded place.

* *Aquilegia coerulea*. Rocky Mountain Columbine. (Rocky Mountains).—Height 12 to 18 inches. In bloom fourth week of May. Flowers large, deep blue with white centre and long spurs. A very beautiful species of which there are some charming varieties in cultivation.

Aquilegia flabellata nana alba. Dwarf White-flowered Columbine. In bloom fourth week of May. The species of which this is a variety comes from Japan. This is a white-flowered perennial with attractive foliage which has a bluish tinge.

Paeonia tenuifolia. Fennel-leaved Paeony. (South-western Europe).—Height 14 to 18 inches. In bloom fourth week of May. Flowers medium size, deep crimson, contrasting well with the finely cut fern-like foliage.

* *Paeonia tenuifolia flore pleno*. Double-flowered Fennel-leaved Paeony. This variety is even better than the species. The flowers are deep crimson and double.

* *Iberis corifolia*. Correa-leaved Candytuft. (Eastern Europe).—Height 1 foot. Begins to bloom during last week of May. Flowers pure white, in compact heads which elongate as later buds open. This is the best of the hardy evergreen candytufts and blooms later than *I. sempervirens*.

Ajuga genevensis. Geneva Bugle. (Europe).—Height 4 to 6 inches. Begins to bloom in last week of May. Flowers bright blue, in compact spikes. This plant blooms so profusely that the foliage, which is also attractive, is almost hidden. Of no value for cutting, but useful for covering the ground. It spreads rapidly.

Iris sibirica. Siberian Iris. (Central Europe to Siberia).—Height 2 to 4 feet. In bloom last week of May. So many fine kinds of better iris follow this species in bloom that in an ordinary border it may be omitted, but where there is a bog this should not be left out as it is quite striking when treated as a wild plant. There are several varieties, ranging in colour from white to deep blue. The native species, *I. versicolor* is almost, if not quite, as good, but does not grow as tall.

Iris Chamæiris. (South Europe). Height 6 inches. In bloom fourth week of May. Flowers bright yellow with brown markings. A pretty species.

* *Iris florentina*. Oris root. (Central and Southern Europe).—Height 2 to 3 feet. Begins to bloom in last week of May. Flowers very large, pale blue or lavender, almost white; sweet scented. A splendid iris.

* *Iris germanica*. German Iris. (Central and Southern Europe).—Height 2 to 3 feet. Begins to bloom in last week of May. Flowers very large, bright bluish purple. Very handsome. This is the old-fashioned species. The varieties, which have been grouped under the name 'German Iris,' bloom early in June. Two fine varieties of the May flowering species are Kharput and Purple King.

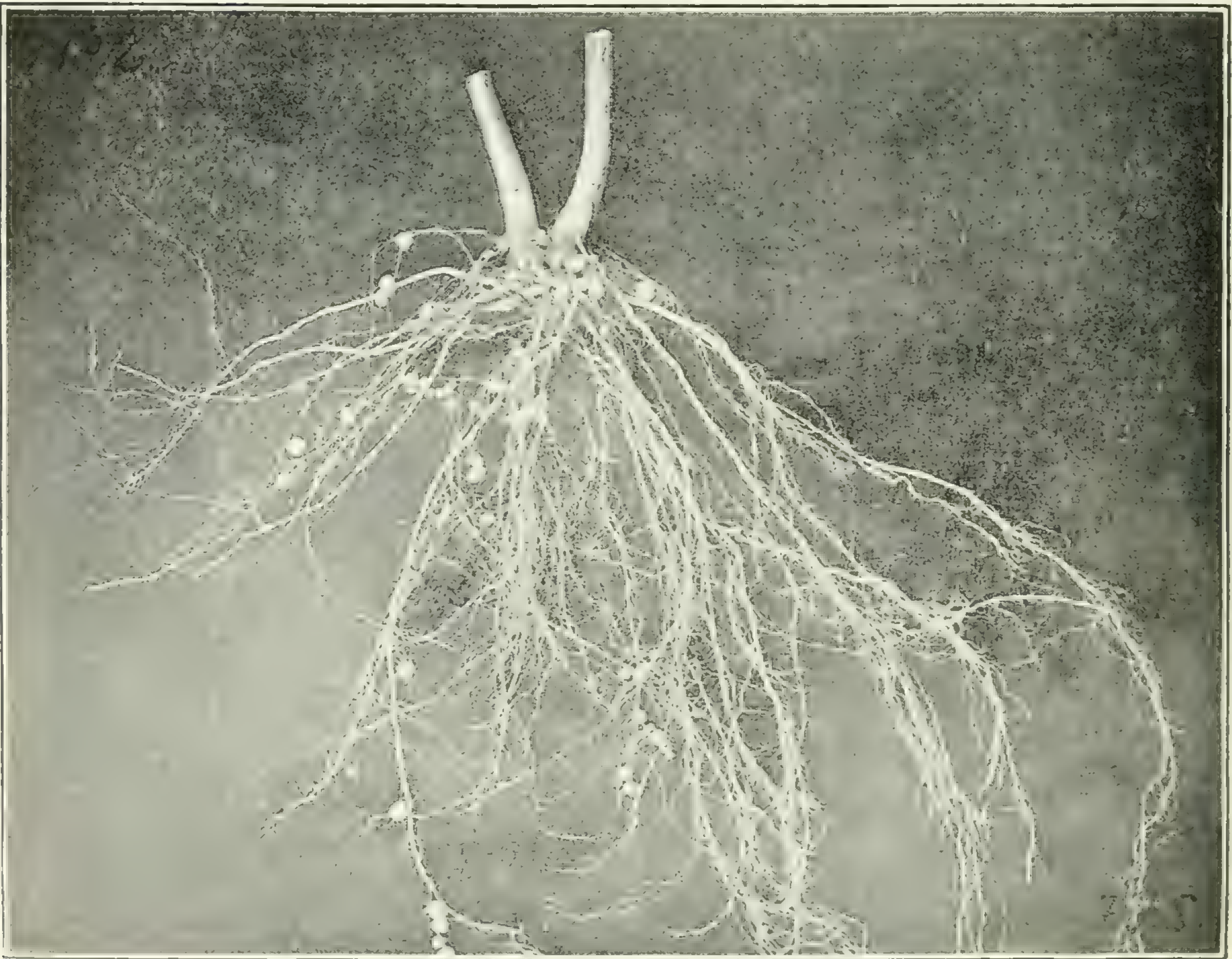
In addition to the above species and varieties, there are some fine native spring flowering perennials which will succeed under cultivation, especially if given partial shade and a liberal supply of leaf mould, among these being :—

Sanguinaria canadensis, Blood Root; *Dicentra cucullaria*, Fly Flower; *Tiarella cordifolia*, False Mitrewort; *Trillium grandiflorum*, White Trillium; *Trillium erectum*, Purple Trillium; *Actaea spicata var. rubra*, Red Cohosh; *Anemone Hepatica*, Windflower; *Viola canadensis*, Branching White Wood Violet; *Viola Dicksoni*, Large blue Violet; *Thalictrum dioicum*, Early Meadow Rue; *Uvularia grandiflora*, Bellwort.

The herbaceous perennials described should be well supplemented in gardens with spring flowering bulbs, which are especially valuable for massing in beds.



SOJA BEANS, COLLECTED SEPT. 15TH.
Height of Plants 3 ft., 3 in. Yield 9 tons, 1,700 lbs. per acre.



SOJA BEANS. ³/₄ Roots (1 ft., 3 in.) showing nodules.

—Photos, by Frank T. Shutt.

REPORT OF THE CHEMIST.

(FRANK T. SHUTT, M.A., F.I.C., F.C.S., F.R.S.C.)

OTTAWA, December 1, 1902.

Dr. WM. SAUNDERS,
Director, Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith the sixteenth annual report of the Chemical Division of the Experimental Farms.

There has been no effort to incorporate all the results obtained in the laboratories during the past year, many of the investigations being still in progress and others having already received publicity in bulletin form. Further, the desirability of reducing the size of the complete report has made it necessary to omit certain details which, though interesting, are not perhaps essential to the elucidation of the results now presented. I trust, however, in the attempt to be concise there has been no sacrifice of clearness and that the explanations and deductions given will be found sufficiently explicit for the purposes of our readers. As in past years, there has been a great deal of work, also, which does not find a place in the annual report from the fact that the results are considered of value only to the individual for whom it was made. Of such work, we may instance the examination of a number of soils and other samples received from farmers. It must not be thought, however, that this has not proved useful and valuable, for the Experimental Farms system seeks to educate the farmer as an individual as well as to benefit the agricultural community as a whole.

Certain investigations that have involved considerable labour, are reported upon elsewhere. Of these we may refer to articles on the fattening of chickens, and on the preservation of eggs, in the present report of the poultry manager; the examination of Canadian honey, in the transactions of the Ontario Bee-keepers' Association; and the analysis of Canadian Creamery Butter, as published by the Dairy Division, Department of Agriculture, Bulletin No. 4, New Series. Mention may also be made of the bulletin on Clover as a Fertilizer, (No. 40, July, 1902, Experimental Farm Series), the joint work of Dr. Saunders and the writer.

No attempt will be made in this letter to summarize the work in this report, but attention may be briefly directed to those investigations which appear to the writer as being of greater interest or importance and which afforded results of immediate and practical value to Canadian agriculture.

The Relation of Cover Crops, Sod and Surface Tillage, to the Moisture content of Soils—This research, begun in 1901, has been continued during the past season, the experiments being carried out on soils of the Central Farm orchards. Further and valuable information has been gained on this important subject, especially instructive being the data obtained from the plot under a two year old sod. According to this year's results, the latter makes a very much heavier draught upon soil moisture than a system which calls for cover crops (*e.g.*, clover) and surface tillage.

Fodders and Feeding Stuffs.—Under this caption we include, first, a report on certain mixed ensilages, (clover and corn) produced on the Central Farm, and show that from such a combination it is possible to obtain a succulent, palatable food considerably richer in the flesh-forming constituents than corn ensilage.

An examination of the ordinary farm roots (mangels, turnips, &c.), has again been made, determining their dry matter and sugar contents. The feeding value of many of them is far in advance of that obtained last year, largely due, we presume, to the favourable conditions of weather prevailing during September. Reference must also be made to the so-called sugar mangels and their general superiority from the standpoint of composition for feeding purposes.

Among fodders, an account of *Bromus arvensis*, as grown in Manitoba, is furnished and its feeding value contrasted with its near relation—the justly celebrated Awnless Brome Grass. Upland and lowland hays from Assiniboia, sedge hay from the salt marshes of New Brunswick have also been analysed. The principal feeding stuffs examined comprise gluten meals and other corn by-products, oil cake, cocoanut cake, cotton seed meal, bran, Blatchford's calf meal, and certain mixed feeds used on board ship for cattle en route to England.

Insecticides and Fungicides.—Analyses have been made of several brands of 'cyanide' upon the Canadian market. This, as is well known, is used largely in fumigation for the destruction of the San José scale on nursery stock. The value of any particular sample of potassium cyanide is, of course, dependent upon its gas (prussic acid gas) producing power, and our results show how far dependence can be placed on the ordinary guarantee under which it may be sold and the causes for deterioration.

The 'Lime, Sulphur and Salt Wash,' or so-called California Spray, is another remedy used in the control and destruction of the San José scale, and very much in favour at the present time for orchard treatment. Certain information, the result of experimental work, is given with regard to the correct proportions of the constituents to be used.

The new insecticide, Bug Death, for which so much has been claimed, has been analysed and the results inserted in this report.

Sugar Beets.—Though we have since the establishment of the Experimental Farms studied the sugar beet as grown in various parts of the Dominion with a view of determining the suitability of our soils and climate for sugar production, there has been an increase this season in the number of samples usually examined. The following provinces are represented:—Prince Edward Island, Nova Scotia, Ontario, Manitoba, and the North-west Territories. The data thus supplied will no doubt prove especially valuable this year, when there is a more than usual interest being taken in the development of the beet sugar industry in Canada. Speaking generally, we may say that our results this year, as in the past, have shown that beets of an excellent quality and purity—and quite suitable for factory purposes—can be raised over large areas in the Dominion. In these favourable areas existing in a large number of our provinces, the beets, if from good seed and properly cultivated, are quite equal to those grown in the United States and European countries for sugar production.

Flour.—The high standing of Canadian Baker's Strong Flour, as manufactured from No. 1, Hard Red Fife wheat, has been brought out by a series of comparative analyses. The data, it is expected, will prove valuable in developing a Canadian export flour trade to the Orient, now largely served by flour from Oregon and Washington.

Tuberculin.—In July of the current year the preparation and distribution of tuberculin was handed over to Dr. Higgins, Pathologist of the Veterinary Branch of the Department of Agriculture. From November 1, 1901, to July 12, 1902, 3,025 doses of tuberculin had been forwarded from the farm laboratory to Dominion Veterinary Inspectors.

Toxicological Work.—At the instance of the Chief Veterinary Inspector, we have during the past year examined several cases of alleged poisoning, reports of the analyses being made to that officer.

Correspondence.—The letters received by this division from November 30, 1901, to December 1, 1902, in addition to those referred to us by the other departments of the farm, numbered 1,163; those sent out during that period, 1,233.

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Samples Received for Analysis.—In the following tabular statement the samples received from farmers during the past year are enumerated and their nature indicated. Every year sees an increase in this branch of our work, which is sufficient evidence of its usefulness and popularity:—

SAMPLES Received for Examination and Report,
November 30, 1901, to December 1, 1902.

Samples.	British Columbia	North-west Territories.	Manitoba.	Ontario.	Quebec.	New Brunswick.	Nova Scotia.	Prince Edward Island.	Total.	Number awaiting examination.
Soils	12	3	5	100	6	3	25	4	158	21
Mucks, muds and marls	2	1	0	4	4	6	9	10	36	8
Manures and fertilizers	0	0	0	4	0	1	7	4	16	6
Forage plants and fodders	2	15	13	74	5	12	9	9	139	19
Well waters	1	12	10	53	19	3	3	1	102	0
Miscellaneous, including dairy products, fungicides and insecticides ..	3	4	4	115	4	7	8	2	147	4
Total	20	35	32	350	38	32	61	30	598	58

Acknowledgments.—The very large amount of analytical work accomplished in the Farm laboratories during the past year has only been made possible by the hearty co-operation of the Assistant Chemists, Mr. A. T. Charron, M.A., and Mr. H. W. Charlton, B.A.Sc. My thanks are due to these gentlemen for their prompt and skilful assistance on all occasions, as well as for their warm interest in the various investigations undertaken by this division.

To Mr. J. F. Watson I am also much indebted for valuable help in connection with the clerical work of the division. His duties have always been performed with assiduity and care, and I am pleased to bear testimony to the excellence of his work.

I have the honour to be, sir,

Your obedient servant,

FRANK T. SHUTT,

Chemist, Dominion Experimental Farms.

SOIL INVESTIGATIONS.

BRITISH COLUMBIA.

Peachland, Okanagan Valley.—Much of the soil of this district appears to be of an extremely light and sandy nature, though under irrigation yielding fair crops. A correspondent, in sending samples of new (surface) soils from that district, states that clover usually grows well and furnishes two or three cuttings in a season, but that garden crops (vegetables) and fruit trees have not been very successfully grown, save with the aid of manure. The soils were of a grayish-yellow colour and would be termed sandy loams of poor quality. The quantity sent did not allow us to make a complete analysis, but certain important data were obtained.

Organic Matter and Nitrogen in (water-free) Soil.

	Organic Matter.	Nitrogen.
No. 1.....	3·66	·048
2.....	4·02	·068
3.....	3·30	·064

Qualitative analysis showed that all the soils possessed a fair amount of lime.

For arable lands these soils are exceedingly poor in nitrogen. It is evident also that they stand in need of humus or semi-decomposed vegetable matter. For these important constituents organic manures must be supplied and the stock of stable manure supplemented from time to time by clover turned under.

A very important matter for such soils as these is that there should be a sufficiency of water, for, poor as they may be in plant food, their crops frequently suffer more from drought than from lack of nourishment. Increasing the soil's store of organic matter not only enriches it in the elements of fertility, but vastly improves its moisture-holding capacity.

As a fertilizer for garden stuff, the following formula may be suggested, the quantity being for one acre :—

	Lbs.
Superphosphate.....	150
Bone meal.....	150
Muriate of potash.....	100–150
Nitrate of soda*.....	100–200

*Applied in two or more applications as a top dressing.

Enderby.—A dark-gray, heavy clay soil, which when received at the laboratory had dried into a hard, refractory mass, indicating a poor or unfavourable condition.

A partial analysis afforded the following data :—

Moisture.....	7·18
Organic and volatile matter.....	10·59
Oxide of iron and alumina.....	24·68
Lime.....	1·21
Nitrogen, in organic matter.....	·301
Lime, soluble in 1 per cent solution of citric acid.....	·075

This soil, as regards nitrogen, must be considered above the average, and this fact no doubt accounts in a large measure for the high productiveness of this land and its suitability for wheat growing. It is also well supplied with organic matter.

The percentage of lime obtained by using hot, strong hydrochloric acid as a solvent is by no means insignificant, but that a very small proportion exists in an available condition is evident from the amount soluble in dilute citric acid, viz., ·075 per cent.

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It seems therefore, from our examination that this might be considered a rich soil, but one that might be improved by thorough drainage, careful working and the judicious use of lime. An application of this 'amendment,' say at the rate of 40 bushels per acre, harrowed under would, we believe, increase the soil's productiveness, and in conjunction with drainage, weathering and 'dry' working of the land, materially ameliorate its physical condition.

The continued use of lime makes it desirable that organic manures should also be employed from time to time, and to this end, if there be not a sufficiency of stable manure, it is advisable to occasionally turn under a green crop, such as clover.

NORTH-WEST TERRITORIES.

Alberta.—At our request, two samples of soil, representative of the first and second foot, respectively, of the land about Lethbridge, Alta., were kindly collected by Mr. W. H. Fairfield, of the Canadian North-west Irrigation Co., Lethbridge, and forwarded to the farm laboratories. In this district the soil is extremely uniform in character, being of the nature of a true prairie and very fertile, provided there is a sufficiency of moisture. There are no woods save in the river bottoms.

In a letter accompanying the samples, Mr. Fairfield writes: 'The soil samples were taken October 20, 1901, from the north-western portion of the Canadian North-west Irrigation Experiment Farm. The spot from which they were taken was typical of the farm, and for that matter of the surrounding country, as far as surface indications (e.g. grass, &c.) are concerned. The land at this point has never been irrigated.' After describing the manner in which the samples were taken, he says: 'No. 1 is therefore, representative of the first foot, and No. 2 of the second foot of soil. The soil changes to a lighter colour at a depth varying from twenty inches to two feet and over.'

The surface soil as received was a dark gray inclining to black, loam, light and friable, free from stones and containing an abundance of root fibres. From appearance, one would judge it of more than average fertility. The soil from the second foot only differs from the surface sample in being slightly lighter in colour and containing less fibre. The soils freed from all fibre were submitted to analysis, with the following results:—

Analysis of (air-dried) Soils.

	No 1. 1st Foot.	No. 2. 2nd Foot.
Moisture	2.53	2.78
Organic and volatile matter	5.74	5.55
Clay and sand (insoluble in acid)	80.74	80.00
Oxide of iron and alumina	8.00	8.01
Lime	1.01	2.07
Magnesia	0.39	0.82
Potash	0.45	0.50
Phosphoric acid	0.12	0.11
Carbonic acid, &c. (undetermined)	1.02	0.16
	<hr/> 100.00 <hr/>	<hr/> 100.00 <hr/>
Nitrogen, in organic matter	0.210	0.145

Available constituents in Surface Soil.

Potash	0.028
Phosphoric acid	0.008

No. 1. In organic matter (humus) and nitrogen, the results are exceedingly satisfactory, indicating a high degree of fertility.

The percentage of potash is somewhat above the average, in lime also this soil is well supplied. The amount of phosphoric acid is not equal to that present in our better virgin soils.

The estimation of the more readily available potash and phosphoric acid furnishes data of a highly gratifying nature as regards potash, but shows that in phosphoric acid the store is of a limited character.

It is not always the case that the amounts of 'total' and 'available' mineral elements correspond, that is, are relative, but in this soil we have an instance which well illustrates an apparent rule as regards virgin soils, that the larger the amount of 'total' the larger the amount of 'available' potash and phosphoric acid.

Our results indicate that cropping will first lead to a deficiency of phosphoric acid, and consequently emphasize the value of a phosphatic manure.

No. 2. Considering the depth from which this soil was taken, the results are remarkable. In all essential particulars they prove the great fertility possessed by this sub-soil, though by reason of its richness in plant food, appearance, texture, &c., we should be inclined rather to consider it as part of the surface soil.

ONTARIO.

Abitibi Region, Nipissing District.—At the request of Dr. Robert Bell, Acting Director of the Geological Survey of Canada, a careful analysis has been made of a sample of soil from this newly explored area of North-western Ontario. The sample was collected by W. J. Wilson of the Geological Survey staff during his explorations of 1901, in the vicinity of Lake Abitibi, at a point on the Black River near its first fall, 17 miles from its mouth. Latitude about $48^{\circ} 38'$, and longitude about $80^{\circ} 27'$. Our report on this soil is as follows:—

General appearance and texture.—This is a sandy loam of a dark-gray colour and showing a considerable amount of vegetable fibre, derived chiefly from fragments of roots and bark.

There are no pebbles and the soil appears to be in an excellent physical condition, due no doubt chiefly to its comparatively speaking large proportion of organic matter. Judging from its general appearance and texture, it should prove a fertile soil, though more suited for potatoes and root crops than for the growth of the cereals.

Analysis of (air-dried) Soil.

Moisture.....	1.86
Organic and volatile matter.....	9.73
Insoluble matter (clay and sand).....	79.96
Oxide of iron and alumina.....	7.67
Lime.....	.45
Magnesia.....	.44
Potash.....	.36
Phosphoric acid.....	.11
Carbonic acid, &c. (undetermined).....	—
	<hr/>
	100.58
Nitrogen, in organic matter.....	.227

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Available Constituents.

A determination of the amounts of phosphoric acid, potash and lime soluble in a 1 per cent solution of citric acid, and consequently to be considered as more or less immediately available for plant use, yielded the following data:—

Phosphoric acid.....	·0192
Potash.....	·0142
Lime.....	·376

This soil appears to be very fairly well supplied with all the essential elements of fertility, save phosphoric acid, which latter is somewhat below the average found in our better and more fertile soils. The proportions of these constituents present in an assimilable condition indicate that it would prove productive.

In humus and nitrogen this soil may be said to be particularly rich, though no doubt much of the latter exists in a condition not immediately available to crops.

Considered from the chemical, as well as the physical, standpoint, this soil might be expected to be one that would yield remunerative crops, provided climatic conditions were favourable.

Mr. Wilson, in his 'Summary Report' for 1901, speaking of the locality from which the soil was taken, says: 'A half-breed family named McDougall have a neat house and small clearing at this point, where they have planted a patch of potatoes which promised an abundant crop. An average stalk measured 42 inches in length and some of the potatoes were quite large.'

In another place in the same report Mr. Wilson makes the following observations regarding the quality of the land and the climate: 'I am convinced that there are large areas of agricultural land of excellent quality, especially in the river valleys, the soil being in most cases a clay loam, free from stones and easily cleared. The climatic conditions also seem favourable for farming operations, and these would improve with the clearing and drainage of the land. When it is remembered that Lake Abitibi is further south than the southern boundary of Manitoba, it will be seen that there is nothing in the latitude to prevent the successful cultivation of the soil, and further, it has been practically proved for many years that vegetables of all kinds can be successfully grown at Abitibi.'

NEWFOUNDLAND.

This soil was forwarded by T. A. Maher, Esq., St. John's, who furnished the following particulars:—

'Soil from farm at Nagle's Hill, 2 miles from St. John's, under cultivation for 20 years; was seeded down to clover and timothy seven years ago and remained undisturbed since. During this seven years it has been continually cropped, but has not received any manure. It was originally a marsh. Surface soil about 8 inches deep; subsoil of brown clay with white and blue stones. The sample indicates the nature of the soil in and about the suburbs of St. John's, which consist of small farms. Surrounding locality wooded with fir and spruce.'

This soil is essentially a gravelly loam, of a dark yellowish gray colour. When air-dried and sifted (using a mesh of .5 mm) the soil was found to consist of:—

	Per cent.
Gravel, pebbles, small rock fragments.....	42·65
Fine soil.....	57·35

The rock fragments appeared to be weathered and partly disintegrated feldspar; the fine soil was chiefly sand, the amount of clay and silt present being small. It is consequently to be regarded as a 'light' soil, with a very loose, open texture and consequently not well adapted to all classes of crops.

On submitting the fine soil to analysis we obtained the following data :

Analysis of (air-dried) fine Soil.

Moisture.....	3·02
Organic and volatile matter.....	20·22
Insoluble residue (chiefly sand).....	63·05
Oxide of iron and alumina.....	11·95
Lime	·43
Magnesia.....	·10
Potash.....	·22
Phosphoric acid.....	·25
Carbonic acid, &c. (undetermined).....	·76
	<hr/>
	100·00
	<hr/>
Nitrogen, in organic matter.....	·536

Available Constituents.

Phosphoric acid.....	·041
Potash.....	·0096
Lime.....	·308

Conclusions and Suggestions.

The most noticeable features in the above data are the comparatively speaking large percentages of organic (vegetable) matter and nitrogen. Though no doubt much of this latter element is in a ‘locked-up’ form, we should not expect that the soil would be greatly benefited by the application of nitrogenous fertilizers, provided climatic influences were favourable for nitrification. Further, although from appearance one might judge the soil as somewhat poor from the physical standpoint and apt to dry out, analysis does not indicate the immediate need of an organic manure. It must be remembered, however, that this soil for the past seven years has been continually in sod, which has had the effect of increasing the humus and nitrogen content, and that if the the soil is now put under active cultivation the tendency will be towards the dissipation of the humus. Consequently, the desirability (under the latter circumstances) of applying farm-yard manure from time to time will be obvious, as well as adopting a rotation which provides for the growth of clover, say every third or fourth year.

The amount of phosphoric acid is somewhat similar to that found in soil of average fertility ; the potash falls slightly below the limit for the best returns. While not rich in lime, it is by no means deficient in this important element.

The percentages of the mineral elements of fertility that may be regarded as more or less immediately available for plant nutrition have been determined. They indicate (1) an apparent sufficiency of phosphoric acid for the present as regards the cereals, though for root crops the amount might be increased to advantage. (2.) That an application of potash would, in all probability, tend to increase the productiveness of the soil. (3.) That the necessity of any special lime fertilizer is not apparent, though, if potash salts are used, it will no doubt be found of benefit to also furnish a small amount of lime. These conclusions and suggestions are based on the analysis of the ‘fine’ soil which, it must be remembered is that part furnishing the immediate sustenance to crops. More than 40 per cent of the soil consists of pebbles, gravel, &c., which though materially affecting the physical character of the soil can scarcely be taken into account when considering the possible stores of plant food.

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THE CONSERVATION OF SOIL MOISTURE IN ORCHARDS.

The subject of the relation of 'cover' crops and cultivation to soil moisture was discussed in our report for 1901. Results were also given of a series of experiments carried out on the Central Farm during that season that demonstrated the intimate connection between the condition of a soil (i.e., whether in crop or cultivated) and its moisture-content. These experiments with certain modifications have been continued during the past summer with the view of still further extending our knowledge on this important matter. The investigation of 1902, comprised two series of experiments. The first was to learn the effect upon soil moisture-content (*a*) by cultivation throughout the entire season, (*b*) by cropping with clover till the end of May or beginning of June, followed by ploughing and cultivation until the latter part of July and then resown with clover, and (*c*) by the growing of clover throughout the season. The second series was planned to ascertain the difference in moisture-content between soil cultivated throughout the season and that kept in (grass) sod.

The moisture determinations were made fortnightly from the beginning of April to the middle of November, on samples taken to a depth of fourteen inches.

First Series.—Three adjoining plots, each 40 by 120 feet, in the apple orchard.

Plot 1.—Disc-harrowed in spring, and cultivated throughout the season at intervals of a few days to a fortnight, as occasion required.

Plot 2.—The clover from the previous year's sowing was cut June 4, but allowed to grow until June 9, when it was ploughed under. The land was then disc-harrowed and kept fallow by constant harrowings and cultivations (June 12, 16, 25 and July 8). It was resown to clover on July 21, but the growth was exceedingly sparse, and the ground became, before the close of the season, virtually covered with purslane, with very little clover showing.

Plot 3.—The plot was allowed to remain in clover (sown in 1901) throughout the season, the crop being cut from time to time, but not taken away. The dates of cutting were as follows: June 4, 26, July 22, August 27.

TABLE I.—First Series—Percentages of Water in Soils, (*a*) cultivated throughout the season, (*b*) under cover crop and cultivated, and (*c*) in clover throughout the season.

Dates of Collection.		Rainfall in Inches.	PLOT 1.	PLOT 2.	PLOT 3.
			Cultivated throughout Season.	Clover ploughed under June 9, cultivated to July 21, then resown with Clover.	In Clover throughout Season.
1902.					
April	5.	1.11	14.77	15.55	15.96
"	19.	.71	10.09	12.96	12.93
May	3.	2.13	13.36	16.03	14.69
"	17.	.52	12.79	10.02	11.89
"	31.	1.10	11.46	10.80	12.00
June	14.	2.14	12.98	12.36	13.16
"	28.	2.01	9.86	13.13	11.79
July	12.	.41	11.30	11.07	9.07
"	26.	3.55	15.44	13.46	13.56
August	8.	.24	11.66	12.91	9.23
"	23.	1.53	13.76	13.72	10.91
September	6.	.49	11.83	7.14	6.99
"	20.	.37	7.85	7.98	5.43
October	4.	1.31	13.33	13.09	10.66
"	18.	1.51	14.45	13.56	14.68
"	31.	1.45	14.57	14.44	14.30
November	15.	1.06	14.63	15.48	15.53

In considering the data presented in Table I. it must be borne in mind that the past season has been a very poor one for clover. The growth on plots 2 and 3 was very sparse and in no way comparable to that of 1901. There, consequently, was not the same draught upon the soil moisture due to the growth of 'cover' crop this season as there was last year. Usually, there is a very fair mat of clover by the middle of May. This season, on June 4, when it was cut, the crop would be considered a very light one. This fact, in addition to an ample and equable rainfall, will, we believe, account in a very large measure for the differences between the moisture contents of the soils of the three plots not being so marked as last year. In other words, the soil conditions on the plots more or less approximated in certain essential particulars. Nevertheless, the results on the whole point in the same general direction as in the previous work, namely, that cultivation conserves soil moisture, and that the growth of a cover crop or sod dissipates it. Hence the wisdom, in districts where there is likely to be a scarcity of rain, of clean cultivation during the period when the trees are most in need of moisture, followed by a cover crop to furnish protection through the winter and enrich the soil. The probabilities are that there is very little necessity, ordinarily, for cultivation in the orchards of the Experimental Farm at Ottawa to conserve moisture, for the district enjoys usually an ample precipitation, fairly well distributed throughout the growing season, and the practice of the Horticulturist in at once seeding down after the ploughing under of the cover crop, receives much support from this year's results.

In reviewing the data presented by the second series of experiments, and comparing them with the foregoing, it will be readily observed that the effect of a permanent sod upon the soil's moisture is very much more marked than that of a cover crop, such as clover.

Second Series.—Two adjoining plots in the plum orchard.

Plot 1.—Cultivated throughout the season of 1902. The dates of cultivation are as follows:—May 8, June 11, July 9, July 29 and August 4. The plot had been ploughed in the spring of 1901 and kept cultivated during the season.

Plot 2.—In permanent (2-year old) sod throughout the season. The grass was cut and allowed to remain that it might act as a mulch. The mowings were on June 2, June 30 and August 11.

TABLE II.—Second Series—Percentages of Water in Soils, (a) cultivated, and (b) in sod.

Dates of Collection.		Rainfall in Inches.	PLOT 1.	PLOT 2.	Excess of Moisture in the Cultivated Plot.	
			Cultivated throughout Season.	In Sod (2nd Year.)		
1902.					Tons.	Lbs. per acre.
April	5.....	1·11	.....	.....	.....	.....
"	19.....	·71	15·31	15·88	16	29
May	3.....	2·13	18·37	16·26	58	1,332
"	17.....	·52	15·37	10·75	117	25
"	31.....	1·10	17·30	9·81	192	211
June	14.....	2·14	16·62	10·49	157	253
"	28.....	2·01	18·19	13·69	121	1,836
July	12.....	·41	16·07	7·24	217	1,136
"	26.....	3·55	14·32	11·80	64	285
August	8.....	·24	14·65	6·47	196	58
"	23.....	1·53	15·83	8·96	171	1,020
September	6.....	·49	13·61	8·33	126	1,818
"	20.....	·37	9·24	4·77	98	1,875
October	4.....	1·31	12·29	9·17	75	980
"	18.....	1·51	14·77	15·12
"	31.....	1·45	15·94	15·57	9	1,946
November	15.....	1·06	16·52	17·29

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This is a most instructive series of results. The data are well worthy the careful perusal of every orchardist.

These two soils started out with practically the same moisture content (see April 19), but as the season advanced and the grass grew, the demand on the soil moisture of plot 2 became greater and greater. This began to be evident soon after May 1. By May 15 there was 50 per cent more moisture in the soil (to a depth of 14 inches) of the cultivated plot than in the soil covered with sod. At the end of May this difference had increased to almost 100 per cent; in other words, there was nearly twice as much moisture in the cultivated soil as in that under sod, due partly to the conserving action of cultivation on the one plot (No. 1), and partly to loss of moisture from transpiration of the foliage and greater loss due to capillary action in the soil on the other (No. 2) plot.

Throughout the whole growing season most marked differences in the moisture-content of the soils of these two plots are to be observed—and always in the same direction. If during the two weeks previous to the collection of the samples there had been an ample rainfall—as, for instance, for the periods ending June 14 and 28, and July 26—the moisture-content of the plots did not differ to the same extent that they did after periods of comparative drought. The last column of Table II furnishes data in this connection of a most decisive character, pointing especially to the heavy call on the moisture of the orchard soil by sod at a time when the trees are most in need of it. Towards the close of the season, when vegetative growth has ceased, and there is a liberal rainfall, the soils approximated more and more in their moisture content, and the experiment closed as it had begun, with soils equally moist or practically so.

In concluding this brief discussion, we may say that although the past season's work did not yield results as regards the effect of cover crops (clover) on soil moisture, of such an emphatic character as those of the previous season (the chief reason for which undoubtedly was the poor growth of clover on the plots this year), the data for the most part corroborate our conclusions given in the report for 1901 on this subject.

The plan or system of orchard management that includes cover cropping and cultivation will vary somewhat according to the district (see pages 149, 150, 151, Report for 1901), but its effectiveness generally in regulating the soil's moisture, in enriching the soil with humus and nitrogen, in arresting the loss of nitrates in the autumn and in furnishing protection during the winter to the trees' roots cannot be doubted.

Perhaps the most valuable lessons from this year's investigation are to be drawn from the experiments of the second series. We learn, in the first place, that a very great distinction must be drawn between sod and cover crops as regards effect upon soil moisture. The former dries out the soil to a much greater degree and consequently cannot be advised, save in exceptionally well watered districts or where the water level is high. As already stated, the system of orchard soil management must be worked out after a careful consideration of the soil and climatic conditions, but it does seem to the writer that the instances in which it would be advantageous to keep the orchard in permanent sod must be exceptional, and especially so when the trees are young.

FODDERS AND FEEDING STUFFS.

CORN AND CLOVER ENSILAGE.

Though corn is, and probably will ever remain, in Canada the most important ensilage crop, the desirability of a succulent roughage richer in protein is often felt and expressed. Naturally, clover, or some other of the legumes, such as horsebeans, occurs to the mind as probably suitable for making such an ensilage, and many experiments have been made to learn with what degree of certainty good ensilage from such crops can be made. As pointed out in our report for 1901 (p. 177-8), certain difficulties are met with in ensiling succulent crops rich in nitrogen, but that with careful attention to one or two details these difficulties may be in a very large measure overcome. Thus, in

the report of the farms just referred to (p. 303) the Agriculturist furnishes particulars of an excellent ensilage made at the Central Farm entirely from clover, palatable and eaten with eagerness by dairy cattle. This ensilage, among others, was submitted to analysis and its superiority to corn ensilage, in point of protein-content, demonstrated, as the following averages make evident :

—	Dry Matter.	Nitrogen Compounds. (Crude Protein).	
		Albuminoids.	Non-Albuminoids.
Corn ensilage...	22·94	·85	1·05
Clover ensilage.	19·76	1·85	1·14

The figures calculated on the water-free basis make the richer character of the dry matter of the clover ensilage still more apparent.

—	Nitrogenous Compounds. (Crude Protein).	
	Albuminoids.	Non-Albuminoids.
Corn ensilage	3·69	4·56
Clover ensilage.....	9·34	5·84

In spite of these very satisfactory results, however, we must recognize that the ensiling of clover by itself is fraught with more or less uncertainty, for efforts made in silos on the experimental farm have at times resulted in a loss or waste equal to 10 per cent of the total feeding value, due to coarseness of material, lack of closeness in packing, or other causes. The plan of ensiling corn with the clover in varying proportions was consequently thought worthy of trial by the Agriculturist of the Central Farm, who carried out the idea in 1901-2, by putting in the experimental silo (made of staves, diameter 9 feet, height 22 ft.), certain mixtures, as follows :—

- A.—Corn, 4 tons ; clover, 2 tons ; sunflowers, $\frac{1}{4}$ ton.
 - B.—Corn, 2 tons ; clover, 4 tons.
 - C.—Corn, 4 tons ; clover, 2 tons.
 - D.—Corn, 2 tons ; clover, 2 tons.
- ‘ D ’ was placed in the silo first, then ‘ C ’, ‘ B ’, ‘ A ’, in the order named.

The corn and clover were run through the cutting machine together, so that they were considered as fairly well mixed.

These ensilages kept very well, with little loss, and are reported by the Agriculturist as of excellent quality and relished by the cattle.

They were analysed, samples for this purpose being taken (at the dates mentioned in the subjoined table) during the period in which they were fed ; February, March and April, 1902.

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CORN AND CLOVER ENSILAGES, 1901-2.

Number.	Date of Collection.	Composition.	ON FRESH MATERIAL.								ON WATER-FREE SUBSTANCE.							
			Moisture.	Protein.	Fat.	Carbo-hydrates.	Fibre.	Ash.	Crude Protein.		Protein.	Fat.	Carbo-hydrates.	Fibre.	Ash.	Crude Protein.		
									Albuminoids.	Non-Albuminoids.						Albuminoids.	Non-Albuminoids.	
	1902.		p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	
A	Feb. 1	Corn 4 tons, clo- ver 2 tons, sun- flowers $\frac{1}{4}$ ton..	75.37	2.68	.35	12.68	6.56	2.36	1.82	.86	10.88	1.41	51.50	26.63	9.58	7.38	3.50	
B	Mar. 14	Corn 2 tons, clo- ver 4 tons	75.20	3.61	.44	10.74	6.66	3.35	2.86	.75	14.56	1.76	43.35	26.84	13.49	11.56	3.00	
C	Apr. 10	Corn 4 tons, clo- ver 2 tons	77.09	3.18	.44	10.30	5.87	3.12	2.18	1.00	13.88	1.92	44.97	25.62	13.61	9.50	4.38	
D	" 23	Corn 2 tons, clo- ver 2 tons	75.62	2.60	.36	11.06	7.14	3.22	1.63	.97	10.69	1.47	45.35	29.28	13.21	6.69	4.00	

Comparing these ensilages, we notice first that in percentage of dry matter three of them, 'A', 'B', and 'D', are almost identical. Ensilage 'C' contains about 1.5 per cent more moisture than the others.

In crude protein, as well as albuminoids, ensilage 'B', consisting of two-thirds clover, is the richest, as might be expected.*

The relation of protein to proportion of clover does not, however, hold good in ensilage 'C', consisting of two-thirds corn, probably due to imperfect mixing of the material when being put into the silo, which would naturally result in the sample for analysis not being strictly representative of such a mixture. The general effect of the clover in increasing the protein-content is, however, well illustrated, especially on comparing these results with those for corn ensilage, as already given in the series. It seems quite possible by this means to obtain an ensilage containing from one-half to three-fourths more of the flesh-forming constituents than is obtainable from corn only. This is, of course, a very important matter, for it points to the fact that the use of such ensilages would allow of a reduction in the grain part of the ration.

The addition of the small proportion of sunflower heads, in ensilage 'A', does not appear to have affected in any marked degree the composition of the ensilage. They were expected to increase the percentage of fat.

The table of data gives the composition of the fresh material and of the dry matter, the latter results allowing a closer comparison to be made as to the changes brought about by varying the proportions of corn and clover.**

BROME GRASS.

The excellent feeding qualities of the Awnless Brome Grass (*Bromus inermis*) have been set forth in previous reports of this division (see reports, Experimental Farms 1897, p. 146; 1898, p. 146), the data obtained in the Farm laboratories having shown

* The 'crude protein' includes the albuminoids or true flesh-formers and the non-albuminoids, the latter consisting of amides and other compounds of much less feeding value than the albuminoids.

** The various constituents of fodders have been discussed and their functions in the animal economy explained in several of the past reports of the chemical division (see, for instance, report for 1900, p. 166-7).

it to be a grass rich in protein (flesh-forming substances), and low in fibre—the least valuable of a fodder's constituents.

Both for hay and pasture this hardy grass has been extensively introduced into Manitoba and the North-west Territories. As a hay grass it has proved a heavy cropper—the hay being palatable and highly nutritious. As a pasture grass it is particularly valuable by reason of its earliness, large growth, and succulent aftermath—features of considerable importance to the farmer, dairyman, and stock raiser.

This year we have made a comparison between the hays of *Bromus inermis* and *Bromus arvensis*, the latter, a grass that has recently received some attention in the North-west, and concerning which Dr. Fletcher, Botanist of the Experimental Farms, furnishes the following information: 'This European grass has been grown to some extent in Manitoba, where some seed was sold as that of *Bromus inermis*. The plants live for two years only, and in most places it is a smaller cropper than *Bromus inermis*. I have cultivated Field Brome since 1892. If cut early it will give a second crop.'

The samples analysed were forwarded by Mr. Herbert W. Husband, St. François Xavier, Man., who writes as follows:—'We have had 3 years experience with *Bromus arvensis* and find it a much heavier yielder than *Bromus inermis*. There is no actual knowledge of its relative feeding qualities compared with *inermis*, and we should, therefore, be glad to have an analysis made.'

An examination of the samples by Dr. Fletcher showed that the *Bromus inermis* was relatively somewhat younger than the *Bromus arvensis*—a large portion of the seed of the former being in the dough condition, while that of the latter was ripe.

ANALYSIS of hays of Awnless Brome (*Bromus inermis*) and Field Brome (*Bromus arvensis*).

Name of Grass.	Hay.						Calculated to water-free substance.				
	Mois- ture.	Ash.	Fat.	Crude Protein.	Carbo- hydrates.	Fibre.	Ash.	Fat.	Crude Protein.	Carbo- hydrates.	Fibre.
<i>Bromus inermis</i> .	7.51	8.25	.43	6.56	50.81	26.44	8.92	.46	7.09	54.95	28.58
" <i>arvensis</i> .	7.73	7.63	.38	4.23	46.55	33.48	8.26	.41	4.58	50.41	36.26

In the subjoined data the proportion of the true albuminoids contained in the crude protein is shown. The non-albuminoid nitrogenous substances, consisting of amides principally, are of much less feeding value than the albuminoids.

Name of Grass.	Crude Protein in Hay.		Crude Protein Calculated to water-free substance.	
	Albuminoids.	Non- albuminoids.	Albuminoids.	Non- albuminoids.
<i>Bromus inermis</i>	5.85	.71	6.32	.77
" <i>arvensis</i>	3.88	.35	4.20	.38

Of the two samples, *Bromus inermis* is evidently the more valuable. This is shown by its larger percentage of protein, as well as by its lower fibre content. Though we have no data as to the relative digestibilities of these hays, it seems at least fair to assume

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that *Bromus inermis*, owing to the smaller percentage of fibre, will not be less digestible than *Bromus arvensis*. If this be granted, the superiority of the former will be obvious. The examination of the crude protein furnishes further results of a confirmatory character and justifies the conclusion that *Bromus inermis* is the more nutritious.

In Bulletin No. 17 of the Experimental Farm Series the writer pointed out that grasses lose somewhat in nutritive value as they approach maturity and the seed ripens. It is probable, therefore, that the analysis of *Bromus arvensis* would have been more favourable to that hay if it had been cut earlier. A similar comparative study will be made next season with the grasses taken at the same stage of growth, in order to obtain further data as to the relative values of these important grasses.

UPLAND AND LOWLAND HAY.

The question has frequently been asked by farmers in Manitoba and the North-west Territories: 'which is the more nutritive, hay cut from the uplands or that from the sloughs?' To obtain data on this important matter we have submitted to analysis two samples collected and forwarded through the kindness of L. G. Bell, Esq., Qu'Appelle Station, Assa. One taken from the 'upland' or prairie, the other from the 'lowland' or swamp or slough.

On arrival the samples were submitted to Dr. Fletcher, botanist of the Experimental Farms, who has furnished the following note regarding their botanical composition:—

Upland hay.—The sample of upland hay consisted chiefly of barren stems of grasses. There were also a few seed-bearing stems of the Rough Fescue (*Festuca scabrella*) and several of the ripe seeds of the Porcupine grass (*Stipa spartea*). The barren stems were apparently *Agropyrum tenerum*, the Western Rye Grass, *Stipa spartea* and *Festuca scabrella*, together with the leaves of one of the small prairie sedges.

Lowland hay.—The sample of lowland hay consisted chiefly of *Poa serotina* and *Deyeuxia neglecta* (grasses) and *Carex aristata* (a sedge) with a few stems with seed on them. All common plants in prairie sloughs.

The analysis of the hays afforded the following data:—

<i>Analysis of Hays.</i>		
	Upland.	Lowland.
Moisture	4.91	4.95
Crude protein*	7.63	5.46
Ether extract, (fat.)	0.96	0.57
Carbo-hydrates (starch, gum, &c.)	40.30	48.95
Fibre	38.46	35.19
Ash	7.74	4.88
	<hr/>	<hr/>
	100.00	100.00
	<hr/>	<hr/>

*Nitrogenous compounds—

Albuminoids	6.56	5.02
Non-albuminoids	1.07	0.44

There are certain somewhat remarkable differences to be noted. The most important of these, from the feeding standpoint, is the much larger percentage of crude protein in the upland hay, making it naturally the more nutritious of the two. The crude protein includes the albuminoids or so-called flesh formers, and the amides, &c., of much less feeding value. The percentage of albuminoids is approximately one-fifth higher in the upland than in the lowland hay. The larger percentage of ether extract (crude fat) in the upland hay would also tend to increase its feeding properties, though its somewhat larger fibre-content is against it. Other matters, such as the noticeable increase of ash in the upland over that in the lowland hay, are of no particular interest from the feeding standpoint and, therefore, need not be discussed here.

Of the relative digestibility of these hays, we have no data, but we may fairly conclude, I think, from the results of this examination that there is a fair margin in favour of the upland hay,

SEDGE HAY.

This hay, although known in the maritime provinces as ‘sedge’ hay, contains, as a rule, very little of the true sedges (which may be very easily distinguished from the grasses in possessing triangular, solid stems), but is made up principally of species of spartina which grow in salt marshes and along sea beaches.

The sample examined, forwarded by Dr. W. W. Andrews, Sackville, N.B., consisted entirely of *Spartina juncea*.

ANALYSIS OF SEDGE HAY.

Constitutents.	Hay, as received.	Calculated on water-free substance.
Moisture.....	8.75	—
Crude protein*.....	5.40	5.90
Fat.....	0.54	0.59
Carbo-hydrates.....	43.99	48.27
Fibre.....	27.16	29.74
Ash.....	14.16	15.50
	100.00	100.00
* Non-albuminoids.....	1.02	1.10
Albuminoids	4.38	4.80

These results indicate for the sedge hay a certain feeding value, though it is not equal to the larger number of cultivated grasses. It compares very favourably with *Spartina cynosuroides* (fresh water cord grass), much esteemed in many parts of the maritime provinces, and known as ‘Broad Leaf.’

In writing of this hay (*S. juncea*) Dr. Andrews, who has given much careful attention to the matter, says: ‘All the facts that I can gather as to the sedge hay are favourable to its use. It can be used to the extent of one-third to one-half of the coarse ration, and many farmers report excellent results from a mixture of half and half with other hays. Horses turned out on ‘sedge’ areas are said to do remarkably well.’ Further, he states: ‘That it has proved valuable for mulching, and will decay in a season when so used or in compost.’ Probably its large percentage as ash, consisting chiefly of common salt, may enhance its mulching qualities as well as add somewhat to its fertilizing value.

ROOTS.

Continuing the determination of dry matter and sugar in field roots in order to ascertain the extent to which these constituents may vary from season to season, we have this year again examined the chief varieties of mangels and Swedes, in addition to certain sugar beets and new varieties in mangels rich in sugar.

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ANALYSIS of Roots, C.E.F., 1902.

	Sowing.	Dry Matter.	Sugar in Juice.	Average Weight of one Root.	
		Per cent.	Per cent.	Lbs.	Oz.
Mangels, Half-sugar Rosy.....	First	14.21	8.79	2	5
" "	Second	15.06	9.95	1	9
" Half-sugar White.....	First	11.85	7.89	1	3
" "	Second	12.36	8.78	2	8
" Giant Sugar feeding.....	First	14.19	9.49	2	0
" "	Second	14.74	9.29	2	1
" Giant Yellow Globe.....	.....	10.24	5.24	3	9
" Giant Sugar Feeding.....	Flat culture.....	16.61	9.69	2	0
" "	Drill "	13.11	7.34	4	7
" Golden Tankard... ..	.....	12.77	8.42	3	2
" Gate Post Red.....	.....	13.90	9.39	3	2
Swede, Prize Purple Top.....	.....	10.37	2.59	2	8
" Champion Purple Top .....	.....	11.15	1.78	2	10
Sugar Beet, Danish Improved	Ordinary culture	19.56	13.33	2	8
" "	Special culture ..	21.41	13.96	2	2

Comparing the results with those obtained in previous years, a decided improvement as to the dry matter and sugar content is noticeable. Evidently the season has been one favourable to sugar production. The feeding value of many of the roots of this season is fifty per cent higher than that of the roots of 1901.

Of the mangels tested from two sowings, those of the second sowing show a slightly higher value. This may be accidental, and therefore needs corroboration before any definite conclusions can be drawn.

Attention may again be directed to the so-called sugar mangels, Half-sugar Rosy, Half-sugar White, &c., which are evidently roots of a high order as far as composition is concerned.

BARLEY.

The use of this grain for feeding is, we imagine, becoming more common in Canada and, in a large measure, in many parts of the Dominion may now be found replacing oats in the ration, chiefly due no doubt to the high price of the latter grain. Barley, like other cereals, is subject to variation in composition, the climatic conditions under which it is grown undoubtedly being the principal factor in its modification. The probabilities are, for instance, that barley grown in Manitoba and the North-west Territories will be richer in protein than that raised in the irrigated districts of British Columbia, which would make the former better for feeding purposes, while the latter would be more valuable for brewing.

Compared with oats, barley, speaking generally, contains less protein but more starch. In oil or fat, oats are considerably richer. As part of the grain ration it has given excellent results with all classes of farm stock, but especially is it valuable for pork production and poultry fattening.

At the request of the Agriculturist of the Central Experimental Farm, we have analysed a sample of Hulless White barley, grown by P. E. Woods, Grand Prairie, B.C. For the purpose of comparison we add the average composition of Ontario barley, as ascertained by the examination of 20 samples in 1895.

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	Hulless White Barley, B.C.	Average of 20 Ontario samples.
Moisture	9·26	11·96
Protein	8·81	10·57
Fat	1·22	2·06
Carbo-hydrates	77·76	68·90
Fibre	1·09	4·10
Ash	1·86	2·41
	100·00	100·00

Though containing somewhat less fibre, the Hulless White barley is not equal in feeding value to the Ontario grown hulled barleys, since it possesses less protein and fat.

OIL CAKE.

Inquiries having reached us from several farmers in Manitoba as to the feeding value of the locally manufactured oil cake meal compared with that of flax seed, we submitted to analysis a sample of the former, forwarded by Mr. K. McIver, of Virden, Man., and stated to be manufactured by Body & Noakes, Winnipeg :—

Analysis of Oil Cake Meal.

Water	7·71
Protein	33·31
Fat	6·26
Carbo-hydrates	36·02
Fibre	10·84
Ash	5·86
	100·00

These data indicate a meal of excellent quality.

The composition of oil cake will vary somewhat according to the process used in extracting the oil, but in that obtained by the new process, the average percentage of protein is 33·2 and of oil or fat 3·0. Such cake differs from that of the old process in being somewhat richer in protein and poorer in oil.

The relative feeding values of flax seed and oil cake meal (old and new process) may be deduced from the data in the following table :—

	Dry Matter in 100 lbs.	DIGESTIBLE NUTRIENTS IN 100 LBS.		
		Protein.	Carbo- hydrates.	Fat or Oil.
	lbs.	lbs.	lbs.	lbs.
Flax seed	90·8	20·6	17·1	29·0
Oil cake (old process).	90·8	29·3	32·7	7·0
Oil cake (new process).. . . .	89·9	28·2	40·1	2·8

In the total amount of ‘dry matter,’ flax seed and oil cake meal are seen to be practically identical. There are, however, certain marked differences in the composition of their dry matter. The flax seed contains from 22 to 25 per cent more oil than the cake, while the latter is 8 or 9 per cent richer in protein.

Assuming for the purposes of comparison that the oil and protein are of equal value (*) and worth two and a half times the value of carbo-hydrates (starch, gum, &c.), we

* It should be stated that for special purposes, as for fattening sheep in winter, for calves, &c., the oil is worth somewhat more than protein.

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find by calculation that 100 pounds of flax seed has a feeding value equal to that of 120 pounds of oil cake. In other words, if the flax seed, for feeding purposes, is worth \$3 per 100 pounds, the value of 100 pounds of oil cake would be approximately \$2.50.

COCOA-NUT CAKE.

This feeding stuff, the residue left from the expression of the cocoa-nut oil, has found much favour among the dairymen of British Columbia. Messrs. Lindsay & Fletcher, Abbotsford, B.C., in forwarding a sample furnish the following information:—‘This feed is procured by a wholesale dealer in Vancouver from a San Francisco house, and presume that it originally comes from the Hawaiian Islands and islands further south. It is sold F.O.B. at Vancouver for \$25 per ton.’ They further say:—‘It is now extensively used by dairymen along the Fraser, who value it highly, thinking it imparts a peculiar nutty flavour to the milk and cream. It would be of great service to us here to know how it compares in feeding value with oil cake selling at Vancouver for \$30 per ton.’

The cake as received was of a light red colour, possessing in a certain degree the pleasant odour and sweet taste of cocoa-nut. I should judge it to be a very palatable food.

Analysis.

Moisture	5.57
Protein	22.37
Fat	9.10
Carbo-hydrates (starch, sugar, &c.)	29.18
Fibre	29.07
Ash	5.71
	<hr/>
	100.00

Its high protein content and richness in fat make it a feeding stuff of considerable value.

To obtain the *approximate* feeding values of cocoa-nut cake and oil cake, we may compare their ‘food units, calculated by multiplying the sum of the protein and fat by $2\frac{1}{2}$ and adding the total to the amount of carbo-hydrates. Thus:—

	Cocoa-nut cake.	Oil cake.
Protein	22.37	33.31
Fat	9.10	6.26
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	31.47	39.57
	2.5	2.5
	<hr/>	<hr/>
	15735	19735
	6294	9914
	<hr/>	<hr/>
	78.675	98.925
Carbo-hydrates	29.18	36.02
	<hr/>	<hr/>
Food units	107.85	134.94
	<hr/>	<hr/>

According to these figures, the oil cake has a feeding value about 25 per cent higher than the cocoa-nut cake. The larger percentage of fat in the cocoa-nut cake, however, would make it specially valuable for furnishing this important element of the ration, and in some measure reduce this difference.

16—10 $\frac{1}{2}$

COTTON SEED MEAL.

Early in the present year our attention was directed to a brand of cotton seed meal for sale in the Maritime provinces which differed in appearance from that usually sold and which was therefore suspected of being of inferior quality. In forwarding a sample for analysis and report as to quality, the Sussex Mercantile Co., Limited, Sussex, N. B., wrote : ‘This meal is of a darker colour than that usually handled here. The farmers in this vicinity have been making complaints, claiming it is not as good an article as the ordinary cotton seed meal of a brighter colour. It is purchased from the Florida Cotton Oil Co., Jacksonville, Florida, through their St. John, N. B., agent and is quoted at \$3 to \$5 per ton less than the ordinary bright meal.’

Analysis.

Moisture.....	9·48
Protein	25·25
Fat.....	5·43
Carbo-hydrates.....	36·05
Fibre.....	18·65
Ash	5·14
	<hr/>
	100·00
	<hr/>

The average composition of cotton seed meal as ascertained from the analyses of 35 samples, is stated by the Department of Agriculture, Washington, D.C., to be as follows :—

Moisture.....	8·2
Protein.....	42·3
Fat.....	13·1
Carbo-hydrates.....	23·6
Fibre.....	5·6
Ash.....	7·2
	<hr/>
	100·00
	<hr/>

In 1900, we analysed two samples of cotton seed meal sold in Canada, and obtained the following results :—

	No. 1.	No. 2.
Protein.....	43·87	43·37
Fat.....	11·63	13·11

It is very evident from the foregoing data, that in the two most important constituents—protein and fat—the sample under consideration is very much inferior to that ordinarily on the market. Thus, calculating on the basis of equal values of the food units in the two kinds, we find that one ton of the ordinary cotton seed meal has a feeding value equivalent to 1 ton 876 lbs. of the Florida Cotton Oil Co.’s meal. We have never before examined a sample with so low a percentage of protein, nor is there any account of such a meal in the standard works on cattle foods.

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CORN BY-PRODUCTS—GLUTEN MEAL, ETC.

In the subjoined table are given the analytical data obtained on certain samples of gluten meal, corn oil cake,* &c., examined in the farm laboratories during the past year :—

	Moisture.	Protein.	Fat.	Carbo- hydrates.	Fibre.	Ash.
Gluten meal	10·83	33·12	6·83	47·26	1·00	·96
Gluten meal.....	10·50	34·75	5·58	46·92	1·77	·48
Corn oil cake.	6·95	26·56	14·40	40·00	10·46	1·63
Corn bran	4·54	11·47	4·53	59·49	17·90	1·02

The whole question of these corn by-products was discussed in our report last year and their relative feeding values explained. It will therefore be unnecessary at the present time to do more than again emphasize the desirability of manufacturers adopting a uniform nomenclature for these corn feeds and to express the hope that ere long all high priced concentrated feeds will be purchased according to protein and fat content. The above data may be considered as eminently satisfactory. It is doubtful, however, if the general run of corn oil cake would contain as much oil as that shown by this sample.

BRAN.

There is a difference of opinion among dairymen regarding the nutritive value of bran from Manitoba and the North-west Territories as compared with that from mills in Ontario. The former is from Red Fyfe; the latter, is variable as to its origin, but frequently we may presume from a mixture of Red Fyfe and some winter wheat which is much softer, such as Clawson. Two samples, representative of such brans, were submitted to us recently by a local dairyman with a view of obtaining some information on this point. As regards appearance, the local bran was brighter in colour and more mealy. Both were apparently of excellent quality. On analysis, they furnished the following data :—

Analysis of Brans.

	No. 1, Keewatin Bran.	No. 2, Dowds (local) Bran.
Moisture.....	11·43	11·24
Protein.....	14·50	15·63
Fat.....	5·76	5·56
Carbo-hydrates.....	49·64	49·48
Fibre.....	12·39	11·46
Ash... ..	6·28	6·63
	<u>100·00</u>	<u>100·00</u>

* All these samples are the product of The Edwardsburg Starch Co., Cardinal, Ont.

The slightly higher percentage of protein in No. 2, makes this bran somewhat the more nutritious of the two.

We shall endeavour to make a further study of this matter, obtaining for this purpose samples of bran from known varieties and mixtures of wheat, and particulars respecting the milling. The present results are to be regarded as tentative only.

BLATCHFORD'S CALF MEAL.

This preparation, like several others of a more or less similar character analysed by us in past years, is sold as a substitute for new milk in feeding calves. Being employed in a test this year by the Agricultural Division of the Central Farm, it was thought desirable to submit it to analysis. The following data were obtained :—

Analysis.

Water.....	9·17
Protein.....	28·44
Fat.....	10·13
Carbo-hydrates.....	38·86
Fibre.....	8·47
Ash.....	4·93
	<hr/>
	100·00
	<hr/>
Water-soluble extract.....	25·90
Saccharine matter, in extract.....	17·07

This feed compares, from the standpoint of composition, most favourably with the calf meals previously examined in our laboratories. Its large percentages of protein, fat, and sugar place it in the category of concentrated feeding stuffs of high value.

MIXED CATTLE FEEDS.

We have again, at the request of the Department of Marine and Fisheries, made an examination of certain feeds with the view of ascertaining their relative nutritive values. The analyses were used in judging as to the best for feeding cattle en route to England. The samples were forwarded by Messrs. Pope & Morgan, Inspectors, Montreal. Our report was as follows :—

Analysis.

	No. 1.	No. 2.	No. 3.
Moisture.....	10·40	10·86	10·12
Protein.....	11·87	9·69	12·87
Fat.....	7·13	4·71	5·91
Carbo-hydrates.....	61·39	64·90	59·71
Fibre.....	6·17	7·55	8·35
Ash.....	3·04	2·29	3·04
	<hr/>	<hr/>	<hr/>
	100·00	100·00	100·00
	<hr/>	<hr/>	<hr/>

For the purpose of comparison, we must assume the feeds to be equally digestible and that the albuminoids (protein) and fat are worth, weight for weight, two and a half times the carbo-hydrates (starch, sugar, &c.) On this basis, we find by calculation that if No. 1 be valued at \$20 per ton, then No. 2 would be worth \$18.53, and No. 3 \$19.63 per ton.

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An examination of the three 'feeds' bears out the deduction from the chemical data with regard to their order of merit. Nos. 1 and 3 contain, in addition to crushed oats and Indian corn, a considerable amount of bran—a by-product rich in protein. The proportion of hulls is decidedly larger in No. 3 than in No. 1, hence the larger percentage of fibre in the former. In view of these facts, I am of the opinion that the nutritive or feeding value of feed No. 1, compared with that of Nos. 2 and 3, is, in all probability, greater than shown by the foregoing computation.

THE SOJA BEAN.

Experiments with Soja beans have been carried on for some years past at the Central Farm, with a view of determining the value of this legume as a fodder plant. As a field crop it was first tried in 1897, and analyses were made in 1898 by us to determine the relative nutritive properties of the plant when grown in various ways. (Report of Experimental Farms, 1898, p. 147). In common with other legumes, the soja bean plant was shown to be rich in albuminoids, and being able fairly well to withstand drought, it was considered a promising crop for use with corn in the silo.

The Soja bean is now under trial as a 'cover crop' for orchards, being sown early in the season in drills. This method appears to have several advantageous features, for it allows surface tillage (between the rows) throughout the summer to conserve soil moisture and at the same time provides for an excellent growth (8 to 14 tons) towards autumn to hold the snow and protect the roots of the trees. Its large percentage of nitrogen gives it an especial value as a fertilizer.

The following data give weights of foliage and roots, per acre, taken this season on the Central Farm:—

	Tons.	Lbs.
Stems and leaves.....	9	1,700
Roots.....		1,382

Average height of plant, 3 feet 3 inches; roots taken to a depth of 15 inches.

The illustration (see frontispiece) shows very well the general form and habit of growth and also the numerous and large nodules with which the roots are supplied, and by means of which the plant can obtain free nitrogen from the atmosphere.

CHEMISTRY OF INSECTICIDES AND FUNGICIDES.

POTASSIUM CYANIDE.

This chemical is now used in large amounts in the fumigation of plants and shrubs for the destruction of the San José scale. All nursery stock imported into Canada from scale-infested countries must be fumigated at the port of entry and before distribution. By the action of sulphuric acid upon the cyanide, hydrocyanic (prussic) acid gas is evolved, the quantity being proportionate to the purity of the cyanide, providing there is sufficient acid present. It is this poisonous gas which destroys the scale.

From these statements it will be evident that the quality of the cyanide in the Canadian market is a matter of some moment. We have accordingly, at the instance of the Entomological Division, examined several samples of cyanide submitted by certain wholesale druggists, and obtained the following results:—

No. 1.—Bottle labelled 'Potassii Cyanidum, C. P.' The Elliott Company, Ltd., Toronto. The bottle contained 4 oz.; the cork was covered with a paper seal but not waxed.

Examination showed that it was sodium cyanide, potash being entirely absent. (a) Sample from top of bottle. This, on analysis, proved to contain 60.26 p. c. of sodium cyanide, equivalent to 33.26 p. c. of hydrocyanic acid.

(b.) Sample from centre of bottle. This sample contained 75·04 p. c. sodium cyanide, equivalent to 41·41 p. c. hydrocyanic acid.

No. 2.—Bottle labelled ‘Potassii Cyanidum, Double Salt.’ The Elliott Company, Ltd., Toronto. The bottle contained 4 oz. ; the cork was covered with a paper seal but not waxed.

Examination showed this to be potassium cyanide with traces or small amounts only of the corresponding sodium salt. A determination of the potash gave data equivalent to 98·7 p. c. potassium cyanide.

(a.) Sample from top of bottle. This gave the following results :—Potassium cyanide 77·24 p. c., equivalent to 32·05 p. c. hydrocyanic acid.

(b.) Sample from centre of bottle. This showed 95·66 p. c. potassium cyanide, equivalent to 39·62 p. c. hydrocyanic acid.

No. 3.—Sample labelled ‘Pot. cyanide 98 p. c., Lyman, Sons & Co., Montreal. Contained in 2 oz. bottle.

Qualitative examination showed this to be potassium cyanide.

Analysis : Potassium cyanide, 94·9 p. c., equivalent to 39·3 p. c. hydrocyanic acid.

No. 4.—Sample labelled ‘Pot. cyanide 98 p. c., Lyman, Sons & Co., Montreal. Contained in 2 lb. glass stoppered bottle. Sample for analysis taken from centre of bottle.

Qualitative examination : potassium cyanide.

Analysis : Potassium cyanide, 94·69 p. c., equivalent to 39·26 p. c. hydrocyanic acid.

Conclusions and Suggestions.

Chemically pure, water-free sodium cyanide would yield 55·18 p. c. hydrocyanic acid. Chemically pure, water-free potassium cyanide would yield 41·49 p. c. hydrocyanic acid.

Tabulating the results, we have :—

	Hydrocyanic acid. Per cent.
Sodium cyanide, pure and water-free.....	55·18
Potassium cyanide “.....	41·49
Sample No. 1, sodium cyanide, from top of bottle.....	33·26
“ “ “ centre of bottle.....	41·41
Sample No. 2, potassium cyanide, from top of bottle.....	32·05
“ “ “ centre of bottle....	39·62
Sample No. 3, potassium cyanide, average of bottle.....	39·30
Sample No. 4, potassium cyanide, centre of bottle.....	39·26

It is a matter of little moment perhaps that the cheaper base soda should be substituted for potash (indeed, weight for weight, pure sodium cyanide will evolve more hydrocyanic acid gas than pure potassium cyanide), but it is of the greatest importance that the cyanide should be of the strength specified and yield the amount of hydrocyanic acid gas as calculated from that strength. The cyanides are extremely subject to deterioration. The action of the air, as entering through a poor cork, is sufficient to cause decomposition, resulting in loss of gas generating strength, as may be observed from the foregoing results.

All the samples examined were below advertised strength, but this, we believe, was not owing to intentional act or fraud on the part of the vendors, but merely to imperfect protection from the air. Most probably the cyanide will be found to retain its strength better when kept in large bottles. When, however, it is desired to have it in small doses, as one, two and four ounces, decomposition of the cyanide may be very largely retarded by thoroughly coating the surface of the cork with paraffin wax.

CALIFORNIA SPRAY.

(Lime, Sulphur and Salt.)

This mixture has recently received considerable attention in the horticultural press in connection with the remedies for the San José scale, and several formulæ with vary-

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ing methods of preparation have appeared. This has given rise to inquiries as to the best mode to adopt in making the spray. To answer these the more satisfactorily, we have made a series of experiments, using the quantities and methods of procedure advocated by the more important authorities, and as a result have obtained information on one or two points that may be of interest to orchardists.

1. Since the insecticidal and fungicidal properties of the spray appear to be due to sulphide of lime and not to free (uncombined) sulphur or lime, it is desirable on the grounds of economy and efficiency that the proportion of sulphur to lime should be such that after boiling there may be little or no free sulphur in the mixture. We find to ensure this that the quantity of lime should at least equal that of the sulphur. A slight excess of lime apparently does no harm, indeed, according to some authorities, it is necessary in order to give the spray the correct consistency, but too large an excess is certainly to be avoided, as it will be apt to cause clogging of the nozzle and possibly reduce the insecticidal efficiency of the wash. We have found the following proportions satisfactory:—

Lime.....	25 lbs.
Sulphur.....	20 “
Water.....	50 gallons.

We also tried a formula with a larger excess of lime and obtained a good result, though possibly not quite so strong in insecticidal properties:—

Lime.....	35 lbs.
Sulphur.....	15 “
Water.....	50 gallons.

2. The lime should be thoroughly slaked to avoid subsequent clogging of the nozzle. If part of the lime is added after the spraying mixture is made, as directed in some recipes, *the proportion of lime to sulphur in the mixture as boiled should not be less than that indicated in the first formula given above.*

3. It is essential that the boiling should be continued a sufficient length of time to allow all the sulphur to enter into combination. This, if accompanied by constant stirring, will be usually between 2 and 3 hours.

4. The addition of salt (usually at the rate of 15 lbs. to each of the foregoing formulæ) is recommended by all writers. This may be due to its alleged action in increasing the adhesive qualities of the spray. It does not seem to affect its properties otherwise.

5. On cooling certain of the lime sulphides formed crystallize out. It is, therefore, important, we consider, to make the application while the mixture is still hot.

The addition of Potash to the California Spray.—It was suggested that potash might be a valuable addition to this spray, enhancing its value probably both as an insecticide and fungicide. We accordingly made some laboratory experiments and found that by the addition of potash to the spray, the fluid which is essentially sulphide of lime is in part decomposed thereby, lime separating and sulphide of potash, soluble in water, taking its place. It is quite possible that the latter compound is as effective as sulphide of lime, but we have no data on that point. For effectiveness and ease of application it is apparently essential that the spray should be used while still hot and, under such circumstances, the addition of the potash would not in all probability, materially affect the application. But if the spray became cold the separation of the lime by the addition of the potash would undoubtedly increase the tendency to clog in the nozzle.

BUG DEATH.

In response to numerous requests from farmers and horticulturists for information regarding 'Bug Death', we submitted to analysis, in January, 1902, a sample of this material, obtaining the following data :—

Analysis.

Moisture.....	0·40 per cent.
Insoluble matter, sand, &c.....	11·21 "
Oxide of iron and alumina.....	5·60 "
Lime	·51 "
Potash.....	None.
Zinc oxide.....	82·10 "
Lead and copper.....	Faint traces.
Phosphoric acid.....	Traces.
Chlorine	·47 per cent.
Nitrogen.....	·107 "

These results show that it is practically an impure or commercial zinc oxide. As regards the essential elements of plant food, it is strikingly deficient, the only constituent present of any fertilizing value being nitrogen, of which there is only one-tenth of one per cent. It is, therefore, obvious that any claims made for it as supplying nourishment for crops are without foundation.

If, as stated in the advertisements of Bug Death, a larger yield is obtained from its use, the explanation may probably be that it acts as a fungicide, preventing blight and keeping the foliage healthy and green. This would mean a longer growing period and, naturally, tend to an increase of crop. Certainly, this material cannot act either directly or indirectly as a fertilizer.

FERTILIZERS.

SQUID AND CAPLIN.

In forwarding these samples for analysis, Mr. J. T. Lawton, of Harbour Grace, Newfoundland, states that caplin and squid, are largely used in Newfoundland as fertilizers, and that some farmers say they have an 'exhaustive' effect, while others esteem them of great value.

Squid.—This is the popular name for a small cuttle-fish found in abundance in North American waters and very largely used as bait for cod. The squid sent to the laboratories had been 'canned', i. e., the fresh squid put into the tin, soldered up hermetically, boiled 1 hour, opened to allow the escape of air, and resealed. No water or salt had been added.

Analysis of Squid.

Water.....	82·74
Organic matter *	16·17
Ash.....	1·09
	<hr/>
	100·00
	<hr/>

	Per cent.	Pounds per ton.
Nitrogen	1·91	38·2
Phosphoric acid	·45	9·0

* Containing 3·16 per cent fat.

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Valuing the nitrogen at 10c. per lb. and the phosphoric acid at 5c. per lb., one ton of fresh squid would be worth \$4.25 as a fertilizer.

Caplin.—A small fish, often occurring in immense shoals in the Gulf of the St. Lawrence and on the coasts of Newfoundland and Labrador. 'It is much used by the poorer classes', writes a correspondent in Newfoundland, 'as an article of food and also as a food for pigs and dogs—about 1,500,000 barrels being salted and dried for the latter purposes.'

Analysis of (salted and dried) Caplin.

Water.	19.13
Organic matter*.....	68.38
Ash (including salt).....	12.49
	<hr/>
	100.00
	<hr/>

	Per cent.	Pounds per ton.
Nitrogen	8.09	161.8
Phosphoric acid.....	2.91	59.2

The fertilizing value of the salted and dried fish per ton is \$19.14. Assuming the caplin as caught and used as a fertilizer to contain 80 per cent water, then the manurial value of such fish would be \$4.77 per ton.

Mr. Lawton further writes: 'The majority of farmers make composts of caplin and squid with clay; but those who have not facilities for getting clay lay the caplin between the potato stalks and 'earth up'. Turf is used with caplin in making compost; but not with squid, as it will not decay rapidly in turf.'

The foregoing analyses show that both caplin and squid are agriculturally valuable as sources of nitrogen and phosphoric acid. They, however, require the addition of some form of potash to make them a complete fertilizer. Wood ashes, muriate of potash, sulphate of potash, and kainite are all potash fertilizers and their application to the soil in conjunction with caplin or squid would no doubt enhance the effect of these 'fish' manures.

PEATS.

Nova Scotia, Brookfield, Queen's County. Forwarded by Mr. Franklyn McLeod:

No. 1.—Surface, moss (Sphagnum). A clean bright sample.

No. 2.—From a depth of 3 feet. Peat. Apparently of excellent quality.

No. 3.—From a depth of 6 feet. Peat. Somewhat darker and more compact than No. 2.

Analysis of air-dried Samples.

	No. 1.	No. 2.	No. 3.
Moisture	7.62	8.03	7.99
Organic matter.....	90.89	90.97	91.02
Ash	1.49	1.00	0.99
	<hr/>	<hr/>	<hr/>
	100.00	100.00	100.00
	<hr/>	<hr/>	<hr/>
Nitrogen	1.510	0.834	1.052

*Containing 13.71 per cent fat.

Though all the samples are excellent and could be used as absorbents in the stable or as composting materials, No. 1 is the most valuable, by reason of its better mechanical condition and larger percentage of nitrogen.

LIMESTONE.

The value of an occasional dressing of lime for soils deficient in this element is fairly well known, but unfortunately owing to the high price or scarcity of this element in many districts the practice of liming is practically impossible. It is from such districts that we frequently receive samples of limestone or of rocks supposed to be such, with a request for information as to their value for lime manufacture. Thus, in our report for 1901 will be found data obtained on specimens sent from certain localities in Quebec and Ontario. This year we present a report on samples forwarded from Heatherton, Nova Scotia, as follows:—

Constituent.	No. 1.	No. 2.	No. 4.	No. 5.	No. 6.
Insoluble rock matter	3.22	5.12	81.35	3.62	3.25
Oxide of iron and alumina, &c.	2.60	6.40	5.00	2.55	2.40
Carbonate of lime	87.70	57.95	8.70	91.80	73.55
Undetermined	6.48	30.53	4.95	2.05	20.80
	100.00	100.00	100.00	100.00	100.00

No. 3.—Omitted from the above table is gypsum or sulphate of lime, a very pure sample. It does not, of course, form lime on burning, but has a value as a fertilizer for certain crops.

The best sample of lime is, naturally, that with the largest percentage of carbonate of lime. This is No. 5. We then have Nos. 1, 6 and 2 in order named. It is doubtful if it would pay to burn this latter, as the burnt rock would only contain 25 per cent lime.

No. 4 cannot be regarded as a limestone, and certainly would be valueless for the production of lime.

MISCELLANEOUS INVESTIGATIONS.

SUGAR BEETS.

The establishment during the past year of no less than four beet sugar factories in Western and North-western Ontario has been instrumental in again awakening a keen interest in sugar beet culture in Canada. Inquiries have been received from farmers in every province in the Dominion with regard to the suitability of the climate and soil of the districts written from, varieties of beets to be sown, culture, &c., and frequently these questions have been accompanied by beets for analysis. These samples, in most instances could scarcely be considered as representative, the results of their examination (though forwarded to the senders) therefore, will not be included here. The analyses of sugar beets grown on the Experimental Farms at Nappan, N.S., Ottawa, Ont. and Indian Head, N.W.T., will, however, furnish useful information and are, therefore, recorded in this report. In addition, we have tabulated the data from samples forwarded from Prince Edward Island; from the Department of Agriculture of Manitoba, and from Strathcona, N.W.T., collected by Mr. N. D. Mills, of that town.

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Prince Edward Island—Six samples forwarded by Mr. Callaghan, of Charlottetown, have been examined. The results are much more favourable than those of 1901, indicating in the majority of instances beets with a very satisfactory sugar content and quite suitable for factory purposes.

SUGAR BEETS, Prince Edward Island, 1902.

Variety.	Locality.	Percentage of Sugar in Juice.	Percentage of Solids in Juice.	Co-efficient of Purity.	Average Weight of one Root.	
					Lbs.	Oz.
1. Vilmorin	St. Dunstan College, Charlottetown	20.49	24.25	84.49	1	15
2. " Imp'd	Royalty.					
2. " ..	Campbellton, Prince Co.....	17.91	21.86	81.93	2	0
3. " ..	West River, Queen's Co.....	15.65	18.94	82.63	1	9
4. " ..	Freeland, Lot 11, Prince Co....	16.85	20.00	84.25	1	1
5. " ..	Foxly River, Lot 11, Prince Co....	15.80	19.43	81.31	1	2
6. " ..	Port Hill, Prince Co.....	14.89	18.77	79.38	1	12

The beets were well grown, free from forkiness and not too large.

Nova Scotia, Nappan.—A summary of the particulars of growth, as furnished by Mr. R. Robertson, superintendent, is as follows: 'Sown, May 20; pulled, Oct. 28; drills, 2 feet apart, plants thinned to 1 foot; clay loam manured at the rate of 20 tons per acre with farm-yard manure; previous crop, clover and aftermath ploughed in.' All the roots were well grown, free from forkiness and not too large.'

ANALYSIS OF Sugar Beets, Nappan, N.S., 1902.

Variety.	Percentage of Sugar in Juice.	Percentage of Solids in Juice.	Co-efficient of Purity.	Average Weight of one Root.	
				Lbs.	Oz.
Vilmorin's Improved.	14.57	18.06	80.67		14
Danish Improved.....	10.18	14.16	71.89	1	9
Red Top Sugar..	12.31	15.39	79.98		11
Red Top White.....	13.20	16.11	81.93		13
Trés Riche (French very rich).....	16.95	20.77	81.12	1	0
Royal Giant.....	8.75	10.84	80.72	1	8
Lane's Improved	11.62	15.86	73.26		15
Klein Wanzleben..	16.08	18.68	86.08	1	0
Danish Red Top.....	10.76	13.87	77.57	1	5

The varieties Très Riche (French very rich), Klein Wanzleben, and Vilmorin's Improved give most satisfactory results, both as regards percentage of sugar and co-efficient of purity.

The other varieties, of which we give results, with perhaps the exception of Red Top White, are too low in sugar content for factory purposes. This does not necessarily mean that the soil or weather conditions were unfavourable, for we understand from excellent authority that the majority of these beets are not grown for sugar.

Ontario, Ottawa.—Eight varieties of sugar beets were grown on the Experimental Farm: First sowing, May 12th; second sowing, May 26th; pulled, October 28th; Soil, sandy loam of good quality.

Drills two feet apart: plants thinned, six to eight inches.

SUGAR BEETS, OTTAWA, C.E.F., 1902.

VARIETY.		Percentage of Sugar in juice.	Percentage of Solids in juice.	Co-efficient of Purity.	Average weight of one root.
					Lbs. Oz.
Vilmorin's Improved,	1st sowing.....	17.74	20.36	87.1	1 3
	2nd ".....	16.78	19.29	86.9	15
Danish	1st ".....	13.28	15.83	83.9	1 10
	2nd ".....	12.86	15.63	82.3	1 1
Red Top	1st ".....	13.59	15.2	89.4	1 1
	2nd ".....	13.31	15.27	87.1	1 0
Très Riche (French very rich)	1st sowing.....	15.58	17.57	88.6	1 2
	2nd ".....	16.04	17.74	90.4	15
Royal Giant	1st sowing.....	11.95	14.73	81.1	1 5
	2nd ".....	11.06	13.60	81.3	1 4
Lane's Improved	1st ".....	14.67	16.70	87.9	1 3
	2nd ".....	14.18	15.79	89.2	14
Klein Wanzleben	1st ".....	17.48	19.00	92.0	1 8
	2nd ".....	18.21	19.98	91.1	15
Danish Red Top	1st ".....	11.98	13.97	85.7	1 13
	2nd ".....	12.06	14.74	81.8	1 1

With two exceptions, the percentages of sugar and purity co-efficients indicate a profitable beet for factory use, the varieties Klein Wanzleben, Très Riche, and Vilmorin's Improved again standing at the head of the list. These latter have shown sugar in juice ranging from 15.58 per cent to 18.21 per cent, and purity co-efficients from 86.9 per cent to 92.0 per cent.

Manitoba.—Fourteen samples, forwarded by Mr. Hugh McKellar, Chief Clerk, Department of Agriculture, Winnipeg, have been examined. Samples 1 to 9 were received on November 10, and unfortunately through insufficient care in packing, the several varieties in each parcel could not be distinguished. These, with the exception of Nos. 2 and 9 fall below the average for profitable sugar manufacture. Samples Nos. 10 to 14 were received on December 5, and were found to be shrivelled, evidently due to drying. This would make the percentage of sugar as obtained somewhat higher than that originally present. The results, however, from the varieties Jaensch Victrix, Très Riche (French very rich), and Klein Wanzleben are such as to indicate rich beets.

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SUGAR BEETS, MANITOBA, 1902.

No.	Variety.	Grower.	Locality.	Percent- age of Sugar in juice.	Percent- age of Solids in juice.	Co-effi- cient of Purity.	Average Weight of one Root.
							Lbs. ozs.
1	Danish Red Top (?).....	P. R. Friesen.....	Gretna	9.46	14.31	66.10	3 6
2	Hanna 2677.....	S. J. Thompson...	St. James	13.88	20.73	66.95	1 12
	Vilmorin's Improved.....						
3	Klein Wanzleben.....	T. Outhwaite.....	Headingly.....	9.51	15.47	61.47	1 8
	New Danish Improved.....						
4	New Danish Improved.....	R. de Vries.....	Louise Bridge...	13.07	18.05	72.41	1 5
5	Hanna 2677.....	M. McKellar....	Pilot Mound...	10.62	15.86	66.96	1 3
	Danish Red Top						
6	?	W. Morden.....	Morden	8.39	12.87	65.19	3 15
7	?	R. Cook.....	Boissevain	6.91	11.99	58.07	3 2
8	Carter's Sugar Cane.....	J. Kircaldy.	Brandon	10.88	16.26	66.91	1 10
	Klein Wanzleben.....						
9	New Imperial.....	R. de Vries.. ...	Louise Bridge...	13.24	18.66	70.95	1 8
10	Jaensch Vietrix.....	— Seafield.....	Ninga	18.71	22.73	82.31	1 2
11	Très Riche (French, very rich)	"	"	20.17	23.05	87.50	15
12	Klein Wanzleben	"	"	16.63	20.42	81.44	1 3
13	Klein Wanzleben	D. H. Scott.	Brandon...	17.19	21.82	78.77	1 1
14	Carter's Sugar Cane.....						

North-west Territories, Indian Head, Assa.—Nine varieties examined. Vilmorin's Improved, Très Riche (French very rich) and Klein Wanzleben show good percentages of sugar, but the others are decidedly below the average.

SUGAR BEETS, INDIAN HEAD, N.W.T., 1902.

Variety.	Percentage of Sugar in juice.	Percentage of Solids in juice.	Co-efficient of Purity.	Average Weight of one Root.
				Lbs. ozs.
Vilmorin's Improved.....	14.12	17.8	79.32	15
Danish Improved.	10.44	14.4	72.50	1 8
Red Top	11.56	15.2	76.05	1 11
Très Riche (French very rich).....	16.52	19.8	83.43	1 0
Royal Giant.....	9.16	12.7	71.89	1 8
Lane's Improved... ..	11.64	15.8	73.39	1 4
Klein Wanzleben.....	14.80	18.6	79.69	15
Danish Red Top.	11.65	15.4	75.65	1 2
Imperial Improved.....	11.42	14.9	76.28	1 4

Strathcona, Alta.—Four samples of Klein Wanzleben were examined, of which the particulars are as follows:—

SUGAR BEETS, STRATHCONA, ALTA., 1902.

Number.	Name.	Variety.	Dates.		Distance between		Remarks.
			Sowing.	Pulling.	Rows.	Plants.	
					In.	In.	
1	R. Sheppard.....	Klein Wanzleben .	May 24	Oct. 10	15	9	Black loam, previous crop for 2 years, potatoes.
2	J. W. Suddaby...	" ..	" 20	" 14	18	8	Prairie loam, no manure ; 1899, turnips ; 1900, potatoes ; 1901, mangels.
3	Win. Place.....	" ..	June 1	" 14	14	8	Deep prairie loam.
4	John J. Scribner..	" ..	May 29	" 17	24	8-10	Black prairie loam, previous crop on new land, potatoes.

The laboratory data are presented in the following tabular form:—

ANALYSIS OF SUGAR BEETS, STRATHCONA, N.W.T., 1902.

Number.	Variety.	Percentage of Sugar in Juice.	Percentage of Solids in Juice.	Co-efficient of Purity.	Average Weight of one Root.	
					Lbs.	Ozs.
1	Klein Wanzleben.....	13·66	18·63	73·3	2	1
2	"	16·04	20·56	78·0	1	12
3	"	13·77	16·97	81·2	1	5
4	"	17·41	20·70	84·1	1	8

It was stated that these beets merely received ordinary field culture.

CANADIAN ‘BAKERS’ STRONG’ FLOUR.

The high standing of Red Fife wheat as grown in the Canadian North-west for the production of a superior bread-making flour has been well established, both by chemical analysis and practical baking tests. Indeed, to the ‘Bakers’ Strong’ as manufactured from No. 1 Hard, is now generally accorded the very highest place as a bread-making flour.

In 1888, in a series of 26 samples of domestic and foreign wheats submitted to analysis in the laboratories of the Experimental Farms, the Red Fife of Manitoba and the North-west Territories was shown to have a very high gluten content and quite equal to that of the very best Russian varieties. (Bulletin No. 4, Experimental Farm Series).

At the World’s Columbia Exposition held at Chicago in 1893, the writer as a professional juror was engaged in the analysis of the cereals entered for award. A summary of the results obtained will be found in the Report of the Experimental Farms for 1895, and the data in full in Bulletin No. 45 of the United States Department of Agriculture, Division of Chemistry. It was gratifying on that occasion to find that the Red Fife

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samples from Manitoba and the North-west Territories were among the very best examined, as the following averages will demonstrate:—

MEANS of World's Fair Wheat Samples.

	Weight of 100 Kernels.	Moist- ure.	Albumi- noids.	Fat.	Fibre.	Ash.	Carbo- hydrates	Wet Gluten.	Dry Gluten.
Domestic (United States) (165).	3·866	10·62	12·23	1·77	2·36	1·82	71·24	26·46	10·31
*Canadian (62).....	4·054	11·69	12·25	1·80	2·26	1·69	70·31	25·13	9·76
All foreign wheat (62).....	4·076	11·47	12·08	1·78	2·28	1·73	70·66	25·36	9·82
All samples (227).....	3·940	10·85	12·20	1·74	2·35	1·81	71·69	26·28	10·22
Manitoba (9).....	3·341	11·98	14·62	1·84	2·32	1·47	67·77	28·52	11·62
North-west Territories (9).....	3·841	11·55	14·53	1·80	2·14	1·63	68·35	31·27	12·44

*This series included wheats, both spring and winter, from Ontario and British Columbia, which materially reduced the average in albuminoids, and in wet and dry gluten.

In 1898 we were enabled to show from analyses made in the farm laboratories that Canadian Bakers' Strong flour, both in amount and quality of gluten was superior for bread-making to the best Hungarian flour. (Report Experimental Farms, 1898, pp. 153-4).

The following are the analytical data then obtained:—

ANALYSIS OF FLOURS.

Constituents.	Best Patents. Lake of the Woods Milling Co.	5-Star Best grade. E. O. P. O. Hungarian.
Moisture.....	11·47	11·51
Albuminoids.. ..	12·59	11·27
Fat or oil.....	1·82	1·87
Ash or mineral matter	·37	·34
Wet gluten	34·22	26·17
Dry gluten.....	12·33	9·79
Ratio of 'dry' to 'wet' gluten.. ..	2·77	2·67

As an effort is about to be made to introduce Canadian flour into Japan, it was thought desirable to make a series of analyses, comparing the flours now being used in that country—chiefly manufactured from wheats (Little Club and Blue Stem) grown in the Walla Walla valley, Oregon, and Washington Territory, with Canadian 'Bakers' Strong.' We should then be in a position to demonstrate their relative merits. We have accordingly this year submitted to analysis the following brands, the samples being furnished through the kindness of Mr. Wm. Hutchison, Commissioner of Exhibitions, Department of Agriculture, Ottawa.

No. 1.—'Bakers' Strong,' milled from Canadian No. 1 Hard.

No. 2.—'Centennial's Best,' milled from Little Club and Blue Stem.

No. 3.—'Legal Tender,' milled from Little Club and Blue Stem.

No. 4.—'Gold and Silver,' milled from Little Club and Blue Stem.

Nos. 2, 3 and 4 are flours from wheats grown in Oregon and Washington, U.S.A., the two latter brands, especially, being those at present exported to Japan.

ANALYSIS OF FLOURS.

Brand.	Mois- ture.	Album- inoids.	Fat or Oil.	Carbo- hydrates	Fibre.	Ash.	Gluten.		
							Wet.	Dry.	Ratio Dry to Wet.
Manitoba 'Bakers' Strong'	13.35	12.13	1.30	72.79	0.60	0.43	38.18	15.95	2.38
Centennial's Best.....	11.23	10.50	0.88	77.03	0.00	0.36	32.95	13.05	2.52
Legal Tender.....	12.57	10.94	0.79	75.12	0.06	0.52	30.74	14.29	2.15
Gold and Silver.....	11.95	8.88	1.25	77.32	0.12	0.48	27.63	11.63	2.37

The most important constituent of flour, from the nutritive standpoint, is the protein or albuminoids, the special function of which is the formation and repair of the principal tissues of the body. The above data show that the Canadian 'Bakers' Strong' is much richer in this respect than the American flours examined. Calculated from the albuminoid-content, we find the following relative values :—

Manitoba 'Bakers' Strong'.....	100.0
Centennial's Best.....	86.5
Legal Tender.....	90.2
Gold and Silver	73.2

The gluten determinations indicate, approximately, the relative values of the flours for bread-making purposes, though the character as well as the amount of the gluten is a most important factor in such a consideration. The bread yield is dependent largely upon the so-called 'strength' of the flour—that is, the power to absorb and retain water—a quality which is directly relative to the gluten-content. The 'capacity for producing a well risen loaf,' which will retain its moisture and elasticity under a crisp crust, is rather due to the nature or physical character of the gluten. Recent research (Osborne and Voorhees) has shown that from gluten two proteid substances may be separated, to which they have given the names glutenin and gliadin, and which exist in varying proportions in different flours. These chemists further demonstrated that strong-flour glutes contain a larger proportion of glutenin than weak-flour glutes, and that it is this constituent which affects beneficially not only the moisture-holding capacity, but also the elasticity of the gluten, and hence the bread-making qualities of the flour.

Our gluten estimations (both wet and dry) give first place to the Canadian flour. Allowing the amounts of wet and dry gluten in it to be represented by 100, we have the following order of merit :—

	Wet Gluten.	Dry Gluten.
Manitoba 'Bakers' Strong'.....	100.00	100.00
Centennial's Best.....	86.3	81.8
Legal Tender	80.5	89.9
Gold and Silver	72.3	72.9

The following notes were made with regard to the quality of the glutes :—

Manitoba 'Bakers' Strong' :—Firm, tough, not sticky, elastic.

Centennial's Best :—Very similar to preceding, but slightly sticky.

Legal Tender and Gold and Silver :—Inferior to foregoing flours as regards elasticity, slightly sticky.

The facts presented by this investigation allow us to conclude that the Canadian flour is markedly superior to the other brands examined for bread-making purposes.

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RIPE AND UNRIPE HONEY.

At the request of the Bee-keepers' Association of Ontario we undertook in 1901 to ascertain what differences in composition might exist between honey taken from uncapped and capped comb, respectively. Honey from the former is known to bee-keepers as immature or unripe, and is generally held to have poor keeping qualities, and therefore its sale either by itself or mixed with ripe honey is a detriment to the honey trade.

In the endeavour to determine the percentage of moisture in the honeys we encountered at the outset certain difficulties, and quickly reached the conclusion that the method employed in obtaining the results on Canadian honeys already on record (Bulletin No. 47, Inland Revenue Department) was unreliable. This method involved the drying of the honey solution on asbestos in a steam oven at 96° C. to 98° C. Under these conditions there is a continuous decomposition of the levulose, resulting in an apparent loss of moisture far in excess of the real percentage present. Further experiments were then made, employing lower temperatures, drying in a partial vacuum, &c., and an account of the results obtained presented to the Bee-keepers' Association at their Convention in Woodstock, Ont., in December, 1901, and have since been published in the proceedings of that association. Our conclusions then were of a tentative character, but the data certainly indicated that the uncapped or immature honey contained more water—probably between three and five per cent—than the fully capped or ripe honey, and, further, that the immature honey has a tendency to ferment and spoil.

In the early months of the present year the analytical methods were more critically examined by Mr. A. T. Charron and the writer and a large amount of work done on various honeys and mixtures of dextrose and levulose in order to learn the most reliable way to estimate the water-content of such substances. This investigation was successful, but as the results are of a purely chemical nature and have appeared in the transactions of the Royal Society (1902), it will not be necessary to here reproduce them.

Our revised data on the 1901 samples are given briefly in the following table, which will scarcely require any words of explanation:—

TABLE I.—Water in Honey, 1901.

Comb.	Where kept.	Bottle closed with	Date of Extraction.	Date of Analysis.	Water, Per Cent.
Fully capped.	Honey room.....	Glass stopper.....	Aug. 6....	Oct. 1....	15.46
"	Cellar.....	"	" 6....	" 1....	15.89
"	Honey room.....	Cheese cloth.....	" 6....	" 1....	16.95
"	Cellar.....	"	" 6....	" 1....	15.84
Partially capped	Honey room.....	Glass stopper.....	July 1....	" 1....	19.12
"	Cellar.....	"	" 1....	" 1....	20.68
"	Honey room.....	Cheese cloth.....	" 1....	" 1....	20.63
"	Cellar.....	"	" 1....	" 1....	21.03
Uncapped	Honey room.....	Glass stopper.. ..	" 1....	" 1....	19.57
"	Cellar.....	"	" 1....	" 1. .	19.24
"	Honey room	Cheese cloth.. ..	" 1. .	" 1....	18.25
"	Cellar.....	"	" 1....	" 1....	22.09

It will be seen that in addition to the main object of the inquiry, we endeavoured to ascertain what effect upon extracted honey might result (*a*) from keeping it in a closed vessel (as in glass stoppered bottles), and (*b*) open to the air (as in a vessel covered with cheese cloth).

Further, half of the samples were stored in the honey-room in a small outbuilding, and half in a cellar, which was, however, dry and well-ventilated.

The honey from the fully capped comb contained from four per cent to five per cent less water than that from the partially or entirely uncapped comb.

The differences in moisture-content between the honeys kept in glass stoppered bottles and cheese cloth covered bottles are so small that we hesitate to draw any comparisons as to the respective merits of these methods of preservation.

The honey from uncapped and partially capped comb was found to have decidedly poor keeping qualities compared with the fully capped comb. Several of the jars of immature honey had fermented when examined in October.

This work was recently repeated on honey of the 1902 crop, with the following results :—

TABLE II.—Water in Honey, 1902.

Comb.	Where kept.	Bottle closed with	Date of Extraction.	Date of Analysis.	Water, Per Cent.
All capped.....	Laboratory.....	Glass stopper.	Aug. 7....	Nov. 6....	15·78
"	Apiary.	"	" 7....	" 11....	15·88
"	Laboratory.....	Cheese cloth.....	" 7....	" 6....	17·35
"	Apiary.	"	" 7....	" 11....	16·25
Partially capped	Laboratory.....	Glass stopper.....	July 7....	" 6....	16·58
"	Apiary.	"	" 7....	" 11....	15·33
"	Laboratory.....	Cheese cloth.....	" 7....	" 6....	15·31
"	Apiary.	"	" 7....	" 11....	15·90
Uncapped	Laboratory.....	Glass stopper.....	" 7....	" 6....	17·13
"	Apiary.	"	" 7....	" 11....	16·33
"	Laboratory.....	Cheese cloth.....	" 7....	" 6....	17·56
"	Apiary.	"	" 7....	" 11....	16·18

We notice in the first place that compared with last year's results the same differences in water-content between the ripe and unripe honeys are not observable, though, as in 1901, the latter contain somewhat the higher percentages. Evidently, the character of the season has an influence in this matter and it is quite possible that some seasons the honey from uncapped comb may be practically of equal quality to that from capped comb.

In the case of honey extracted from fully capped comb, it would appear that it absorbed moisture from the air to a slight extent when kept in cheese cloth covered vessels. Experiments are now in progress to ascertain the effect of dry and moist air, respectively, on extracted honey.

The investigation with ripe and unripe honey will be further proceeded with, and as results of interest are obtained a report will be issued.

THE PERCENTAGE OF WATER IN CANADIAN CREAMERY BUTTER.

The recent enactment in England that butter to be accounted legally genuine should not contain more than 16 per cent of water, made it desirable that we should obtain, for our own information as well as that of the English public, data regarding the moisture-content of Canadian creamery butter. We have accordingly, at the instance of the Dairy Division of the Department of Agriculture, submitted to analysis since June last 105 samples of such butter, 75 being collected at the creameries from the butter as ready for the final export package, and 30 from warehouses at Montreal from packages already on their way to the English market.

Of the 75 samples sent direct from creameries, 6 were from Prince Edward Island, 2 from New Brunswick, 15 from Quebec, 26 from Ontario, and 26 from the North-west Territories. With one or two exceptions, they were all manufactured in July or August.

The results of this investigation, together with an account of the method of sampling and analysis employed, have been published as Bulletin No. 4, New Series, Dairy Division, Department of Agriculture, Ottawa. It will, therefore, only be necessary in

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this place to summarize the data and point out the position of Canadian creamery butter in respect to moisture-content as compared with other butters entering the English market.

Range of Water-content in Canadian Creamery Butter.

Percentages of Water.		Number of Samples.
Between 7 and 8..	.....	1
8	9	1
9	10	4
10	11	15
11	12	24
12	13	23
13	14	24
14	15	10
15	16	2
16	17	1
		<hr/> 105 <hr/>

Average per cent of Water.

In samples from creameries (75)	12·16
In samples taken at warehouse (30)	12·69
In 105 samples	12·31

For the purpose of comparison of Canadian creamery butter with that of certain European countries also exporting butter to England, we give the following averages, taken from the recent report of the Departmental Committee on Butter Regulations (England, 1902):—

Percentage of Water in Foreign Butters.

Danish—average of 2,001 samples, summer.....	14·03
“ 1,930 “ winter.....	14·41
“ in 1889–92, 1,288 samples.....	14·58
“ 1887—1900, 8,384 samples.....	13·97
Swedish—average in 1894—1900, 8,384 samples.....	13·57
Irish, yearly average 1896, 131 samples	13·93
“ 1897, 329 “	14·31
“ 1898, 298 “	14·42
“ 1899, 552 “	14·24
“ 1900, 615 “	14·11

This investigation has not only furnished proof of a most satisfactory character that Canadian Creamery Butter falls well within the limits set by the English law but also that it is much ‘*drier*’ than much of the butter made in Europe and which is met with as a competitor in the English markets.

WELL WATERS FROM FARM HOMESTEADS.

Of the 102 samples of water received, 74 have been submitted to analysis, the remainder, owing to insufficiency in the quantity sent or for other valid reasons, were not examined chemically. Nineteen are reported as pure and wholesome, seventeen as suspicious and probably dangerous, twenty-six as seriously polluted, and twelve as saline waters.

ANALYSIS OF WELL WATERS, 1902.

RESULTS STATED IN PARTS PER MILLION.

Number.	Locality.	Marks.	Date.	Free Ammonia.	Albuminoid Ammonia.	Nitrogen in Nitrates and Nitrates.	Chlorine.	Total Solids at 103° C.	Solids after Ignition.	Loss on Ignition.	Phosphates.	Report.
			1901.									
1	Newburg, Ont.	H. W.	Dec. 4.	30.19	.076	None...	47150.0	78855.2	...	...	...	Saline water.
2	Hanover, Ont.	J. J. W.	" 18.	.06	.112	3.516	10.0	368.8	254.4	114.4	None...	Suspicious.
3	Shawville, Que.	R. D. F.	" 21.	.012	.101	7.975	29.0	348.0	195.6	152.4	"	Seriously contaminated.
4	South End P. O., Ont.	C. F. M.	" 26.	None	.15	14.58	94.0	701.6	422.8	278.8	Trace...	Very seriously polluted.
5	Routhwaite, Brandon, M.	G. J. G.	" 28.	1.318	.141	2.836	180.0	5140.0	4328.8	811.2	V. H. trace.	Saline water.
6	Ottawa, Ont.	Mrs. R.	Jan. 8.	1.065	.251	7.536	60.8	520.0	357.6	162.4	Trace...	Polluted and dangerous to health.
7	Snow Flake, Man.	J. S.	" 24.	.054	.588	.021	None...	323.0	232.0	91.0	H. trace...	Free from pollution.
8	Carleton Place, Ont.	J. D. E. No. 1.	Feb. 1.	.056	.165	18.862	66.75	691.6	544.4	147.8	None...	Most seriously polluted.
9	"	No. 2.	" 1.	.05	.14	17.048	73.0	700.0	544.0	156.0	V. S. trace.	"
10	St. Francois Xavier, Man.	L. O. P.	" 24.	...	...	...	3700.0	9708.8	8870.4	838.4	...	Saline water.
11	East Templeton, Que.	F. C.	" 24.	.08	.097	1.136	3.8	240.0	168.8	71.2	Trace...	Probably free from contamination.
12	Brandon, Man.	J. M. A.	Mar. 1.	1.99	.125	.716	225.0	6064.0	5420.0	644.0	H. trace...	Saline water.
13	Cornwall, Ont.	G. H. P.	" 22.	.055	.135	1.264	1.5	76.0	40.4	35.6	None...	Pure and wholesome.
14	Gatineau Point, Que.	H. K.	" 25.	.638	.188	.072	80.0	692.4	580.4	112.0	V. H. trace.	Contaminated with drainage.
15	Moosomin, Assa	J. B. T. No. 1.	" 29.	1.585	.119	.224	77.0	2700.0	2116.4	583.6	None...	Saline water.
16	"	No. 2.	" 29.	1.568	.096	1.854	39.0	1675.2	1336.0	339.2	"	"
17	Westboro', Ont.	J. G. C.	April 3.	.072	.215	16.255	84.0	691.2	536.0	155.2	Trace...	Probably unsafe for household use.
18	"	"	" 17.	.222	.28	13.454	99.5	752.0	555.2	196.2	S. trace...	Undoubtedly polluted.
19	Eden, Man.	J. R. S.	" 30.	.443	.143	.093	31.5	3544.8	2916.0	628.8	Trace...	Saline water, seriously contaminated.
20	Rideau River, Ont., opp. Con. K.	J. B. No. 1.	May 9.	.038	.382	.081	2.1	168.8	85.6	83.2	S. trace...	Unpolluted.
21	Ottawa East, Ont.	" No. 2.	" 9.	.030	.070	.0543	7.4	265.6	169.6	96.0	V. S. trace...	Suspicious.
22	Rideau Canal, Ottawa, O.	" No. 3.	" 9.	.032	.420	.0263	3.8	160.0	78.8	81.2	"	Not a first class water.
23	Ottawa East, Ont.	" No. 4.	" 9.	.024	.134	2.088	8.0	244.8	137.6	107.2	"	Shows signs of contamination.
24	"	No. 5.	" 9.	.204	.083	.0082	12.8	264.0	173.6	90.4	S. trace...	"
25	Lake Dechêne	A. D. C.	" 12.	.012	.227	.1137	1.6	56.0	24.8	21.2	None...	Excellent, pure.
26	Avonmore, Ont.	H. A. McM.	" 15.	.039	.562	13.96	80.0	732.0	422.0	310.0	Trace...	Seriously polluted.
27	Shelburne, Ont.	D. H.	" 28.	.17	.058	.039	4.0	229.2	175.2	54.0	V. S. trace...	Probably good and wholesome.
28	Clarksburg, Ont.	W. H.	" 30.	.621	.082	.0038	72.5	2616.0	2240.0	376.0	None...	Very suspicious.
29	Kepock, P. E. I.	P. C.	June 3.	.012	.091	15.307	87.0	348.4	286.0	126.4	Trace...	Seriously contaminated.
30	Elm Creek, Man.	P. D. A.	" 16.	.20	.31	13.012	7.5	3692.0	2158.0	1534.0	"	Saline water.
31	Navy Bank, Man.	W. C.	July 3.	.283	.191	.0725	71.0	628.0	388.4	239.6	V. H. trace.	Suspicious.
32	Nicolet, Que.	J. B.	" 7.	.44	.183	.005	81.0	374.0	266.8	107.2	"	Very suspicious.
33	Rideau River, Ont.	J. B. No. A.	" 8.	.025	.385	.031	2.5	166.0	74.0	92.0	V. S. trace...	Pure, wholesome.

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34	Wright, Que.	"	No. B.	"	.023	.39	.029	2.4	177.0	80.0	97.0	S. trace.	"
35	"	"	"	"	.373	.101	4.041	3.5	189.6	100.8	88.8	V. H. trace.	Polluted.
36	"	"	"	"	.16	.06	5.332	5.5	198.0	100.0	98.0	S. trace.	"
37	"	"	"	"	.024	.195	None	1.3	59.2	26.8	22.4	None	Excellent, pure.
38	"	"	"	"	.01	.062	11.099	142.5	852.4	436.8	415.6	V. H. trace.	Polluted.
39	Bay View, N.S.	"	"	"	4.42	.253	27.48	390.0	1160.0	831.0	326.0	Trace.	Very seriously polluted.
40	Oshawa, Ont.	"	"	"	.033	.206	15.851	42.5	786.0	472.0	314.0	V. S. trace.	Dangerously contaminated.
41	"	"	"	"	.276	.094	12.29	42.0	631.0	397.0	234.0	Trace.	"
42	Hazeldean, Ont.	"	H. H. A. No. 1.	Aug.	.024	.138	4.382	15.5	245.2	175.6	69.6	"	"
43	"	"	No. 2.	"	.124	.32	.886	21.5	268.3	164.8	104.0	"	"
44	"	"	No. 3.	"	.048	.05	4.198	16.0	214.4	123.2	91.2	H. trace.	"
45	St. Eugène, Que	"	"	"	1.955	.212	.122	220.0	4636.0	4471.5	215.5	Trace.	Saline water.
46	Lavant Station, Ont.	"	"	"	.012	.111	.085	3.5	257.5	155.2	102.3	"	Not polluted.
47	Wolseley Assa.	"	"	"	.118	.115	.034	9.0	484.4	368.4	116.0	"	Not contaminated.
48	Indian Head, N.W.T.	"	I.W.&L.C. No.1	"	.072	.187	.946	53.7	1522.4	1122.4	400.0	V. S. trace.	Saline water.
49	"	"	No. 2	"	.039	.143	2.433	10.3	522.4	378.4	144.0	Trace.	Very suspicious.
50	"	"	No. 3	"	.052	.385	29.313	100.0	4272.0	3216.8	1055.2	H. trace.	Saline water.
51	"	"	No. 4	"	.02	.355	.178	1.0	273.6	168.8	104.8	"	Unpolluted, wholesome.
52	Almonte, Ont.	"	"	"	.048	.067	1.031	10.0	368.8	237.2	131.6	Trace.	Suspicious.
53	St. John, N.B.	"	"	Sept.	None	.093	.095	5.0	68.8	42.4	18.4	S. trace.	Good and wholesome water.
54	"	"	No. 2.	"	.313	.103	None	7400.0	11411.2	9968.0	8443.2	None	Saline water.
55	"	"	"	"	.132	.152	.220	4.0	32.0	21.6	10.4	S. trace.	Suspicious.
56	Ottawa, Ont.	"	"	"	.423	.240	None	233.3	732.0	607.2	124.8	Trace.	Unpolluted.
57	Fairmeade, N.W.T.	"	"	"	.722	.138	.270	15.9	1128.8	862.4	266.4	S. trace.	Contaminated and dangerous to health.
58	Appleton, Ont.	"	"	"	.087	.097	.224	2.0	318.0	...	...	V. S. trace.	Suspicious.
59	Ottawa East, Ont.	"	"	"	.016	.329	.077	2.2	126.4	60.4	66.0	"	Pure, wholesome.
60	"	"	"	"	.014	.320	.092	2.0	127.6	61.6	66.0	"	"
61	Grenfell, Assa.	"	"	"	.29	.615	26.27	82.5	2306.0	1248.0	1058.0	"	Dangerously contaminated.
62	Billings Bridge, Ont	"	"	"	.016	.085	.019	3.0	276.0	174.4	101.6	"	Free from pollution.
63	London, Ont.	"	"	"	.06	.156	7.667	34.0	599.6	361.6	238.0	Trace.	Seriously polluted.
64	Georgeville, Que.	"	"	Oct.	.30	.153	.217	2.5	240.4	140.4	100.0	None	Suspicious.
65	Waskada, Man	"	"	"	2.54	.28	.041	505.0	2447.2	2271.2	176.0	H. trace.	Seriously polluted.
66	Wright, Que.	"	"	"	.16	.275	.889	None	212.0	124.0	88.0	"	Suspicious.
67	Annapolis, N.S.	"	"	Nov.	.016	.145	.173	4.0	32.8	10.4	22.4	H. trace.	"
68	Vankleek Hill, Ont.	"	"	"	.09	.108	5.825	6.0	308.0	189.2	118.8	Trace.	"
69	Treherne, Man.	"	"	"	.130	.282	.104	35.0	4783.6	3739.2	1044.4	H. trace.	Saline water.
70	Rideau River, Ont	"	"	"	.024	.371	.036	2.9	145.6	80.0	65.6	Trace.	Pure, wholesome.
71	"	"	"	"	.021	.390	.346	2.5	145.2	80.8	64.4	"	"
72	Highbate, Ont.	"	"	"	.26	.087	.003	87.5	401.6	360.4	41.2	"	Seriously polluted.
73	Ottawa East, Ont.	"	"	"	.02	.455	6.185	105.0	653.0	522.0	130.2	"	Polluted.
74	"	"	"	"	.016	.248	7.84	165.0	923.2	741.2	182.0	"	"

The results of this examination have again emphasized the folly of locating the well in the farmyards and under or near the farm buildings, as is so often practised, for by far the larger number of bad waters are from such wells. From every standpoint—the health of the family, thrift of stock, and quality and wholesomeness of dairy products—there can be no doubt as to the desirability of a water supply absolutely free from pollution. The danger from using a water which has even remotely received excrementitious matter is a serious one, though it may be insidious in its character and difficult at times to recognize. This we have repeatedly in the past pointed out and explained and, therefore, refrain now from speaking further on the subject.

We are extremely glad, however, to note that throughout the Dominion, farmers are paying more and more attention to the quality of the water supply for their household and stock, and are exercising greater care in protecting it from pollution. We feel sure that this movement will result in much good directly and indirectly to the agricultural community.



SIMPSON'S TRUE-PERENNIAL RED CLOVER.

1. Showing stoloniferous habit of growth.
2. Plot, 33 ft. x 8 ft.3 in., in flower. Height, 6-12 in.

REPORT

OF THE

ENTOMOLOGIST AND BOTANIST

(JAMES FLETCHER, LL.D., F.L.S., F.R.S.C.)

1902.

OTTAWA, December 1, 1902.

Dr. WM. SAUNDERS,
Director of Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to hand you herewith a report on some of the more important subjects which have received attention in the Division of Entomology and Botany during the year 1902. Many other subjects have taken up some of the time of the staff, but do not require special treatment in this report. The ever increasing number of applications for information continue to give encouraging evidence as to the utility of the investigations carried on year by year in the Division. The gradual but sure adoption by farmers of such scientific methods of protecting their crops from the attacks of injurious insects and destructive fungi, as spraying, &c., must to a large measure be traced directly to instructions given by officers of the Experimental Farms.

Correspondence.—The large correspondence of the Division has been of the usual varied character, and as in the past shows a considerable increase in the numbers of letters received. From November 30, 1901, to November 30, 1902, the number of letters exclusive of circulars, registered as received, is 3,215, and the number despatched 2,845.

Meetings attended.—Meetings of farmers' institutes, and agricultural associations of various kinds, have been attended whenever other official duties would allow of my absence from Ottawa.

January 8 to 10, Whitby, Ont.—The Eastern Ontario Dairymen's Association, where addresses were delivered: (1) 'Hay and Pasture Grasses,' 'The Cultivation of Flowers.' The Ontario Ladies College:—'The Value of Nature Study in Education.'

January 20 to 24, Wolfville, N.S.—Nova Scotia Fruit Growers' Association: (1) 'Insects Injurious to Fruits,' (2) 'The San José Scale in Canada.'

January 23, Amherst, Nova Scotia Farmers' Association: 'Farmers' Friends and Foes,' 'Pasture Grasses, Potato Rot, and Injurious Insects.'

February 5, Howick, Que.—Huntingdon Dairymen's Association: (2) 'Potato Rot,' (2) 'Quack Grass, Perennial Sow Thistle and other Weeds,' (3) 'The Care of House Plants.'

February 7, Cowansville, Que.—District of Bedford Dairymen's Association: (1) 'Insects Injurious to Farm Crops,' (2) 'The best Pasture Grasses for Quebec Province,' (3) 'Potato Rot,' (4) 'Perennial Sow Thistle and Quack Grass.'

February 17, Hamilton, Ont.—Hamilton Horticultural Society: The Flora of the Rocky Mountains.'

February 18, Toronto.—Toronto Normal School: 'Nature Study.'

March 6, Ottawa.—Canadian Forestry Association: Discussion of Forest Insects.

March 21, Ottawa.—Ottawa Normal School: 'Our Common Birds and What they do.'

May 20, Niagara Falls and St. Catharines.—Examining the experiments by Mr. Geo. E. Fisher, the Provincial Inspector for controlling the San José Scale.

June 4, Orillia, Ont.—Orillia Horticultural Society: 'Remedies for Orchard Insects and how to apply them'. The East Simcoe Farmers Institute: 'Insects injurious to farm crops.'

June 12-30.—Holding meetings in south-eastern Alberta for the North-west Government.

July 28-31.—Attending the Summer School of Science at St. Stephen, N.B., where an address was delivered on July 30 upon 'Nature Study in Education', and some other addresses before the botanical class of the Summer School.

August 5-11.—Holding farmers' meetings in Prince Edward Island in company with Prof. Robertson, at Summerside on 5th, Kensington on 6th, New Perth on 7th, Charlottetown on 8th, Crapaud on 9th, and Tignish on 11th.

August 14, Aylmer, Que.—Fruit Growers' Association of Quebec: 'Fruit Insects of the year'.

September 9-10, Brome, Que.—Attending the Brome County Exhibition, where an exhibit was arranged showing growing fodder grasses, as well as bundles of the dry hay and all the weeds of the district in a fresh and preserved condition.

September 12.—Visited Oka, Que., and examined the experiments which had been made some years ago in planting pine groves to prevent sand from blowing, and also the gardens of the Trappists' Monastery, and the extensive orchards of Mr. R. W. Shepperd.

September 23, Richmond, Ont.—Carleton Model Fair: Judged the collections of natural history objects made by the teachers and school children of the district, and gave an address on the value of these to the farmers assembled.

September 24, Whitby, Ont.—Model Fair. Judged the collections made by the teachers and school children of the district in the afternoon, and in the evening gave an address on the value of this work to farmers and particularly to the parents of the children engaged in the work.

September 25.—Visited Niagara Falls, investigating the progress of the San José Scale experiments, and inspected the Fumigation Station.

October 28, St. Catharines and Niagara-on-the-Lake.—Accompanied the Ontario San José Scale Commission, examining the experiments in treating trees for the San José Scale by the Provincial Inspector.

October 29, London, Ont.—Entomological Society of Ontario, annual meeting. Addressed Pea Weevil Conference in the afternoon 30th. 'Injurious Insects of the year' and 'Entomological Record for 1902'. Three papers were also read at this meeting by my assistant, Mr. Gibson.

Fodder Plants.—The copious rains of the past season gave the experimental grass plots, a chance to recover from the effects of injury from drought last year and severe frost early in the winter of 1901-02. The growth of all varieties was very luxuriant, and the large collection of grasses and clovers attracted the attention of all visitors. Among experiments of special interest were rows of peas grown to illustrate the injury done by the Pea Weevil and the Pea Moth; also beds of fall wheat sown at different dates last autumn, and plots of Chess and fall wheat which are planted every year to show farmers that these two plants have no relationship to each other. During the summer we have been able to convince many, who thought otherwise, that this is the case, by digging up plants of chess after the heads have appeared, and showing that the chess seed was still attached to the roots. This seed is entirely different from that of fall wheat, having a husk upon it which bears a fringe of bristles along each side of the conspicuous groove. I would suggest to some of those who still believe that chess is 'degenerated

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fall wheat' that they try this experiment for themselves. They will at any rate convince themselves that chess plants will grow from chess seeds, which is frequently stated not to be the case. Several new varieties of grasses and clovers have been added to the collection during the past year.

Insects of the year.—A satisfactory feature of the year 1902 has been a marked decrease in the injuries by some of our well known pests, such as the Codling Moth, the Cankerworms and the Tent Caterpillars, through most of our fruit-growing districts. Insect enemies which require at the present time more attention than they are receiving from the people most concerned, are the following. The Mediterranean Flour Moth, although seldom mentioned, is becoming abundant in mills in various parts of Canada. Where thorough fumigation with sulphur has been tried and frequently repeated, the best results have been obtained. This, of course, must be accompanied with scrupulous cleanliness, the mills being frequently swept down, and as small a stock as possible of ground grain or cereal products, kept on hand. Opening the mills frequently to the full intensity of the winter cold, has also been useful in checking this insect. The Buffalo Carpet Beetle is extending the range over which it is a troublesome household pest. The Eye-spotted Bud-moth did considerable harm in the orchards of the Maritime Provinces last spring. In Manitoba, particularly about Sewell Station, much loss resulted from neglecting to fight Locusts. The wheat crop of Manitoba was in some places rather seriously injured by the Hessian Fly, but the Provincial Department of Agriculture has made widely known the best way to cope with this pest. The San José Scale work in south-western Ontario is now beginning to bear excellent fruit, in the discovery of what may be called a practical remedy for this terrible pest. It has been shown during the past summer that trees which have been thoroughly sprayed early in the spring with the California lime-sulphur-and-salt wash, as well as with a modification of this, with the salt omitted, and subsequently with the ordinary kerosene emulsion, may be kept free from injury by the San José Scale. There is every reason to hope that, as this remedy becomes more generally applied, the San José Scale may be brought down to the status of an ordinary fruit pest. It will, however, require constant and extreme care, or the state of the orchards will soon revert to what it was a year ago. The San José Scale is still the very worst insect we have ever had to fight, and there must as yet be no relaxation whatever in the campaign against it. The insect requiring perhaps more attention than any other at the present time, is the Pea Weevil, which annually destroys upwards of one million dollars worth of the field peas of Ontario. I have endeavoured to draw particular attention to this insect with the object of inducing all pea growers, whether seed merchants, farmers or private individuals, to adopt the well tried and simple remedies by which this insect can be much reduced in numbers. There are perhaps more reasons to hope that total extinction of this serious enemy might be attained than is the case with many others we have to deal with. The Cattle Horn-fly, possibly from the nature of the season, increased noticeably in many parts of Canada, particularly in the maritime provinces, whence frequent demands for advice were received. Another result of the wet weather which prevailed in most parts of Canada, was the somewhat unusual amount of injury from slugs. These molluscs are not insects, but it is to the student of insects that most inquiries regarding them are directed.

There were no important additions to our list of injurious insects during the past year. The incident of greatest interest was the occurrence of a single specimen of the Brown-tailed Moth at St. John, N. B., where it was captured by Mr. Wm. McIntosh of that city. This is a European pest which, after the notorious Gypsy Moth, has caused more anxiety than any other insect in the New England States, excepting perhaps the San José Scale. Two fruit pests, enemies of the strawberry, the caterpillars of a geometer moth, *Petrophora truncata*, and of a noctuid, *Scopelosoma trisignata*, probably only of minor importance, have been received from British Columbia. These are widely distributed insects but have never previously been complained of as enemies of the fruit grower.

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Collections.—The work of arranging the collections in the Division of Entomology and Botany and putting them in such condition that they can be easily consulted by visitors, has progressed satisfactorily. Large numbers of specimens of both insects and plants have been received, and the collections are becoming a valuable source of reference. Mr. J. A. Guignard, who has charge of the herbarium, has added many mounted plants from all parts of the Dominion, which have been received from correspondents, sent in for identification, or collected by the various officers of the Division. Mr. Arthur Gibson has continued the arrangement of the cabinets of insects, and has added many interesting specimens illustrative of the life histories and habits of crop pests and other insects.

During the season, as heretofore, many students in all parts of the Dominion have sent in specimens of insects and plants for identification. Many large collections have been received for this purpose, from which much valuable knowledge, as to the distribution of our native insects and plants, and as to the occurrence of the weeds of cultivated lands, has been gathered. Records have been taken of these, and in addition many desirable specimens have been acquired for the museum. So many collectors have generously presented specimens for our cabinets that it would be impossible here on account of limited space to give a list of these, but mention must be made of the following:

A representative collection of British Columbian Geometridæ from the Rev. G. W. Taylor, of Wellington, B. C.

Collections in all orders of insects, and many consignments of the eggs of rare mountain species, from Mr. J. W. Cockle, of Kaslo, B. C.

Rare British Columbian plants, from Mr. J. R. Anderson, Victoria, B. C.

Acknowledgments.—As in the past I have been during the season of 1902 under great obligations to my many correspondents, including several members of the Select Standing Committee of the House of Commons on Agriculture, who have notified me of outbreaks of injurious insects and have assisted in carrying out experiments for controlling the same. It is not possible to report upon a great deal of this work at the end of each year, but careful records are always preserved, and, when occasion demands for the treatment of any subject in the annual report, great care is taken to give proper credit for such assistance where it is due. The value of exact observations is constantly being illustrated in the scientific study of insects, and this even many years after the observations were made. In devising remedies for injurious insects, the success or failure of these will in all cases depend on the accuracy of our knowledge concerning the habits of the insects to be fought against.

In conclusion, I take pleasure in again testifying to the assiduity and excellent work constantly done by my assistants, Mr. J. A. Guignard, B. A., and Mr. Arthur Gibson, to which such success as has attended the development of the Division is largely due.

I have the honour to be, sir,

Your obedient servant,

JAMES FLETCHER,

Entomologist and Botanist.

DIVISION OF ENTOMOLOGY.

CEREALS.

Reports from all parts of the Dominion announce that the grain crop of 1902 has been abundant and of good quality with little injury by the ordinary insect pests. Any injury mentioned is from weather. In British Columbia Mr. J. R. Anderson says: 'Weather conditions were good and the crops correspondingly so. The yield of wheat in the Okanagan was very large and the quality extra good.' In the North-west Territories Mr. A. W. Peterson described the crop of all kinds of grain as 'enormous beyond precedent and of the finest quality.' Crops of fall wheat seen by me at Pincher Creek and among the Mormon settlements of south-western Alberta can only be described as magnificent, notwithstanding the excessive rains of June and July. In Manitoba Mr. McKellar sums up the reports from his correspondents as follows: 'The best crop ever raised in Manitoba; wheat No. 1 hard or No. 1 Northern. It is hardly possible to describe the perfect weather with which this province was blessed during harvest and threshing. Never in the history of the province was so much work done in the short period of ten weeks, and the garnering of the greatest crop ever grown in the province was done almost without interruption. Of our crop of over 50 millions of bushels of wheat, half was already marketed by the end of November. Threshing was practically finished and more fall ploughing done by the middle of November than was done altogether last fall. All grain crops are equally large; we have upwards of 35 million bushels of plump heavy oats and nearly 12 millions of barley.' Prof. James reports the yield of fall wheat in Ontario as 'above the average for 20 years, and spring wheat, good both in yield and quality.' 'The chief damage to crops everywhere was from rain; comparatively little injury was done by insect pests, despite the fears entertained of the Hessian Fly.' The same satisfactory reports come from Quebec and the maritime provinces. Father Burke, of Prince Edward Island, writes in November last: 'The harvest is abundant, and, as the loss from insects has been almost nil, the farmer wears his sunniest smile in the presence of bursting barns and well filled cellars.'

The only insect enemies of cereal crops requiring mention this year, are the Hessian Fly and locusts, in Manitoba.

THE HESSIAN FLY
(*Cecidomyia destructor*, Say).

The remarkable and almost entire disappearance of the Hessian Fly from the wheat fields of Ontario in 1902 after the excessive injury in 1901, is a subject of constant and grateful comment by correspondents. There has been, however, slight injury in Prince Edward Island. A few straws containing puparia were sent in by Mr. E. Wyatt, of Pleasant Grove, P.E.I., but the loss in the field from which they were taken was hardly perceptible, and no other correspondents make mention of it. In travelling through Prince Edward Island in August last, I could neither hear of nor see any trace of this pest. The most notable attack by the Hessian Fly in 1902 has been in the wheat crop of Manitoba, and several specimens of injured straws were received in September and October. Reports were also received in June of injury to the root shoots of growing wheat at Treesbank, Man. This attack at the root is very seldom noticed by farmers,

and other causes are suggested to account for the destruction of the plants, which is frequently considerable. Mr. Criddle, of Aweme, is of the opinion that many of the

reports concerning cutworm injury in the wheat fields through that part of Manitoba where he is, should really refer to Hessian Fly. Mr. A. Cooper, of Treesbank, sent me specimens of wheat, saying under date of June 3: 'I have noticed a great many dead and dying wheat plants in this locality this spring, and have examined my own fields to try and learn the cause. When the injury was first noticed, the wheat was three or four inches high. To-day I find a small white maggot imbedded in that part of the stem below the ground between the surface and the seed, and, after examining your report on Hessian Fly for 1899, page 167, I came to the conclusion that this fly was the cause of the damage. The place where the damage is worst on my land, is on a piece of spring ploughed stubble land which bore a heavy crop last year and was ploughed five or six inches deep this spring. The injury seems to be worst wherever the land is loosest. One place where my cattle had tramped the ground hard there is no injury. A neighbour's summer-fallowed field is far worse than mine. I am afraid of further injury later in the summer from these pests, which I suppose is bound to happen, should my diagnosis be correct.'—A. COOPER.

Fig. 1.—The Hessian Fly: attacked barley stems; 1, elbowed down; 2, showing 'flax seeds.'

This is the only district in which the attack on the root shoots was noticed, but later in the year several reports were received of injuries at Stockton, Wawanesa, Rounthwaite, Blythe and Aweme. When the wheat was cut, it was found that in certain places in western Manitoba many of the straws were broken down from having been injured by the Hessian Fly. Articles were published in the press by the Deputy Minister of Agriculture for Manitoba, and by Mr. W. H. Coard, of the Commissioner of Agriculture's Branch at Ottawa, in which the life history of the Hessian Fly was given and the best means of dealing with it. There is only one annual brood of the Hessian Fly in Manitoba, the eggs being laid upon the leaves of the young plants, and, according to the development of the plant at the time the maggots attack it, the larvæ are found either in the axils of the leaves below the surface of the ground, or, if the stem has begun to shoot, in the axils of those leaves on the stem nearest to the ground. The maggots assume the flax seed or pupa condition about mid-summer; but the flies in the hot dry autumns which prevail in Manitoba, probably in most cases and certainly in many, as I have seen by actual observation, do not emerge until the following spring. Therefore, the problem of controlling the Hessian Fly in Manitoba is far simpler than in the East, where the greatest damage is done to fall wheat in the autumn. In Manitoba no fall wheat is sown; so, if any flies emerge in the autumn, they die without doing any harm, because no winter grain is sown in Manitoba, and the Hessian Fly does not subsist on any wild grasses. The remedy, therefore, is comparatively simple. When Hessian Fly is known to be present, grain should be cut high and the stubble burned over or ploughed down in autumn. For fear that any of the flax seeds might be carried in the straw, this should be fed to stock or burned before the time that the flies emerge the following spring. Many of the flax seeds may be seen beneath threshing machines when straw has been badly infested. Therefore, all screenings or rubbish from machines should be put where poultry can get at it, or where it will be trampled into the ground during the winter by stock.

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THE PEA WEEVIL OR 'PEA BUG'

(Bruchus pisorum, Linn.).

Attack.—A small, brownish-gray, very active beetle, one-fifth of an inch long, with two conspicuous black spots on the end of the body, which emerges from seed peas in



Fig. 2.—The Pea Weevil: all stages—shown of the natural size and enlarged.

autumn or in spring, leaving a small round hole. The insect is generally spoken of under the incorrect name of 'Pea Bug,' and infested peas, as 'buggy' peas. The egg is laid on the outside of the young pod, and the grub on hatching eats its way in and penetrates the nearest pea. Here it remains until full grown, consuming the interior of the pea and passing through all its stages, from a white fleshy grub to the pupa, and then to the perfect beetle. Some of the beetles, the percentage varying with the season, escape from the peas, occasionally as early as harvest

time, or during the autumn, and pass the winter hidden away under rubbish or about barns and other buildings. As a rule, however, the larger proportion do not under ordinary circumstances leave the peas until the time when peas are sown the following spring, and consequently may be carried into new districts previously uninfested. It may be added to this that the perfect insects fly easily and for long distances, and that they are attracted by instinct to growing fields of peas, where they feed upon the foliage and flowers of the plants until the young pods are formed. The beetles which leave the peas in autumn and those which remain in the seeds till the following spring, all become fully developed at the same time, which is about the middle of August, and all, whether they winter outside the peas or inside the grain, die about the same time the following season, viz., during the month of June.

The life history and habits of the Pea Weevil are so well known, and have been so frequently explained to farmers and other pea growers that it may seem superfluous to some for me again to draw attention to this matter. However, the loss at the present time is so great and is increasing so rapidly year by year that it is, I believe, the most important subject in connection with my official work, which I have to-day to bring before Canadian farmers; and, as I fully believe that an enormous improvement can be made without difficulty in the existing deplorable condition of affairs, simply by practising more universally methods which are well known to be effective and which are to some extent used, the Hon. Minister of Agriculture has instructed me to do everything in my power to urge everyone connected with the growing, handling and marketing of peas, to unite in one great effort to reduce the serious loss which is taking place every year. If this can be done, I see no reason to doubt that even total extermination of this serious pest might be arrived at in a comparatively short time. There is nothing new in the way of remedies, nor, indeed, are any better remedies than have been known for many years, necessary. Since 1888 attention has been constantly drawn in my reports to the remedies which have been found effective, but apparently little has been done, and the insect has now increased so much in all the counties of the province of Ontario, where formerly peas of the very finest quality were produced, and which lie to the south of a line drawn from Kincardine on Lake Huron, through Lake Simcoe and Peterborough county about Fenelon Falls to Brockville, that pea growing is no longer a paying industry. Moreover, from the efforts made by seedsmen to obtain peas uninjured by the weevil, by having them grown in uninfested districts, the range of infestation has been widely spread in counties lying to the north of this line, because seed peas have been sent out for propagation for this purpose which had not been properly treated before sowing so as to destroy the contained weevils.

The importance of the Pea Crop both to the farmer for feeding, and for the excellent condition the land is afterwards left in for the cultivation of other crops, as well as to the merchant for export, makes it most advisable that everything possible should be done to preserve the trade in this important cereal. At the present time there is a most decided inclination on the part of farmers to give up growing peas on account of the difficulty of securing a crop free of the weevil. In many districts where formerly large and very remunerative crops were grown, hardly any are now sown, and the decrease in the acreage sown to peas in Ontario in 1902, as given in the Crop Bulletin for August last, of the Ontario Bureau of Industries, is 70,000 acres less than in 1901. It is possible that this diminution in the number of peas sown may to a certain degree affect beneficially the amount of occurrence of the Weevil next year, but this alone cannot possibly solve the question at issue, i.e., such a wholesale destruction of the Pea Weevil, that the whole of the province of Ontario may again become what it certainly was in the past, the best country in the world for the production of peas of the highest quality on the market. This end, I am confident, is well within the bounds of reasonable possibility, but will depend upon a much wider application than has ever been practised in the past, of concerted measures, which must be adopted simultaneously wherever peas are grown, both in Canada and the United States.

I have carried on during the past season a very extensive correspondence with the leading grain merchants, seedsmen, farmers, and other pea growers in the province of Ontario as well as in Montreal, from which port the greater part of the crop for export is shipped. From this correspondence I have been able to learn, I believe, pretty thoroughly what the condition of affairs, with regard to the destruction of the pea crop by the Pea Weevil, is at the present time. This article is written as a special effort to induce everybody concerned, to do something *now*, more definitely and in a more concerted manner than has ever been done before. An agitation has already been created through the efforts of this Division working conjointly with the Provincial Department of Agriculture through Prof. Lochhead, of the Ontario Agricultural College at Guelph. An important conference was held at the annual meeting of the Entomological Society of Ontario, when a resolution was passed requesting the Superintendent of Farmers' Institutes for Ontario to allow this matter to be brought prominently before every farmers' institute meeting in the province during the coming winter. Mr. G. C. Creelman, the energetic Superintendent of Farmers' Institutes for Ontario, very soon afterwards sent out to all institute workers a circular letter in which is plainly shown the great interest taken in this matter by the Provincial Minister of Agriculture. In this circular, all who are going to address institute meetings this winter were instructed to attend the annual meeting of the Experimental Union and Provincial Winter Fair at Guelph, and it is stated to be the wish of the Minister that, 'all institute workers should this year be prepared to discuss the Pea Weevil. To this end arrangements have been made, whereby special instruction will be given on this subject at the Experimental Union and Winter Fair. Prof. Lochhead, of Guelph, and Dr. Fletcher, of Ottawa, will discuss the matter. I would be pleased therefore, if you would keep yourself informed as much as possible along this line.' The matter came up for consideration at both of these important meetings and was discussed with earnestness, not only by the institute workers, most of whom were in attendance, but by several other farmers who were present. Full accounts of both the London and Guelph conferences appeared in the *Toronto Weekly Sun*, the *Montreal Weekly Star* and the *Farmer's Advocate*. These articles were widely copied in the public press, and a special bulletin has been prepared by Profs. Lochhead and Zavitz, which will appear before seeding time next spring. Timely articles will be issued next season telling pea-growers what to do, and advising them as to all details of the proposed campaign against this enemy.

Among those who have taken an active part in the discussion of the best means of remedying the existing injury to the pea crop by the weevil, the following have assisted by giving valuable suggestions and information as to the range and extent of the depredations, and by sending samples of peas, which have been fumigated at various dates to destroy the weevils:—

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Adamson, E., grain inspector, Toronto.	Martin Bros., Mount Forest, Ont.
Allan, The J. H., Seed Co., Picton, Ont.	Matthews, W. D., & Co., Toronto.
Balkwill, J. A., London, Ont.	McFee, Alex. & Co., Montreal.
Bruce, J. A., & Co., Hamilton, Ont.	Montreal Board of Trade.
Carruthers, Jas., & Co., Toronto.	Niles, W. P., Wellington, Ont.
Coryell, The J. L., Seed Co., Oshawa, Ont.	Pearce, Wm., London.
Crain & Baird, Toronto, Ont.	Rennie, Wm., Toronto.
DeLaporte, A. V. & Co., Toronto.	Ross, W. (M.P.), Port Perry, Ont.
Ewing, W., & Co., Montreal, Q.	Simmers, J. A., Toronto.
Hamilton, A. M., & Co., London, Ont.	Smith, W. L., Toronto.
Hay Bros., Listowel, Ont.	Steele, Briggs Co., Toronto.
Hodson, F. W., Ottawa, Ont.	Thomson, Wm., Mitchell, Ont.
Hopkins, H. T., Picton.	Wilcox, H. H., Oshawa.
Lick, Elmer, Oshawa.	Wright, A. A., (M.P.), Renfrew, Ont.

My thanks are particularly due to Mr. R. F. Stupart of Toronto, for a liberal supply of skeleton maps of the province of Ontario, which were of great use in collecting data as to the injurious presence of the Pea Weevil in the province; also to Prof. C. C. James, Deputy Minister of Agriculture for Ontario, for much valuable advice and assistance.

The extent of the injury.—Judging from the loss during the past ten years, and the present state of affairs, the loss attributable to the work of the Pea Weevil cannot fall far short of \$1,000,000 a year.

The necessity of immediate action.—Every correspondent speaks emphatically of the necessity of some steps being taken at once to preserve this remunerative industry. All agree that the injury is very great and that fresh districts are becoming infested every year. Messrs. Jas. Carruthers & Co., extensive operators of Toronto, Montreal and Winnipeg, write: 'We estimate the injury to the crop of 1902, as compared with the previous years, is 50 per cent more, both as to the quantity raised and the value. Districts that the bug did not appear in three years ago, are gradually getting bad, and, if it continues, we don't think there will be a county in the province that will not be affected. We are very much pleased to learn that steps are being taken to try and eradicate this pest.'

Nearly every one heard from writes in the same strain. The value of Canadian peas and the danger of losing the trade are indicated by the following:

'Toronto, Oct. 25.—Canada formerly had the reputation in European markets of producing the best peas in the world, but we find now, since the crop has become so badly affected by the weevil, that they will only buy the very choicest samples we can ship. One of our largest buyers writes us that they are getting large shipments from Calcutta, and the quality is very fine, being free from bugs, and better than any we are shipping from Canada. They also say they are buying them at a price equal to three cents per bushel less than we are asking for our No. 2 grade on the present crop'.—JAS. CARRUTHERS & Co.

'Toronto, October 25.—The difficulties arising from handling weevil-eaten peas have become so great, that this season we are having some peas grown in Germany, a sample of which has just come to hand; and, while they have had a wet season, which has more or less injured the colour, yet they are entirely free from the weevil. It is more expensive to obtain peas from such sources than when grown at home; nevertheless, we must have the best samples obtainable, even if at a higher cost. Our experience in this matter will tend to encourage larger orders with our foreign growers, although we would prefer growing them at home if we could be satisfied that the existing trouble would not continue.'—THE STEELE BRIGGS SEED Co.

'Picton, October 25.—The question of controlling the Pea Weevil is of the greatest importance to farmers throughout Ontario, and deserves careful thought and united

intelligent action. Aside from the importance of the pea crop as a commercial commodity for export, both as fancy or garden varieties, and for food purposes, it is one of the most valuable crops the farmer can raise for feeding on the farm, particularly in finishing and fattening his pigs, as no other grain will equally accomplish this purpose, and pork and bacon are among the most valuable products of the farm.'—J. H. ALLAN & Co.

'Toronto, October 25.—The trade in peas has been most profitable to farmers, and before this pest became serious, Canada enjoyed the reputation of growing the best peas available for the European demand, largely for human food. It is, therefore, highly important that some concerted action should be taken at once and information given through your department, looking to the interests of the trade by stamping it out effectually, if possible. The bug appears to have spread insidiously year by year and now extends into almost every district in the province'.—W. D. MATTHEWS & Co.

'Toronto, October 27.—Our reports show that the Pea Weevil is gradually extending northward. A few years ago none were to be found in the neighborhood of Stayner, but last year a few were discovered, and this year they have increased. The writer this year found them in peas around Thornbury, and everything points to the fact that they are spreading over the province. Unless something is done, our whole pea crop will be destroyed. This has been one of the most profitable crops to the farmers in the past when our peas were sound; but heavy losses have been made by exporters on peas which looked comparatively free from bugs when shipped, but on their arrival at the other side of the ocean the bugs had emerged and almost swarmed in the bags when these were opened.'—A. V. DELAPORTE & Co.

'Picton, October 21.—As far as we know, the seedsmen in the United States bug their peas, but the farmers do not. I do not think there are enough peas imported from the States to make much difference in this question. As to districts free from weevil, we grew peas in Simcoe county last year, and there were no bugs, and there are very few from Peterborough north.'—CLEVELAND SEED Co.

That some districts are, so far, free of the weevil, the following evidence shows:—

'Renfrew, October 22.—Our soil and climate are peculiarly well adapted to growing the ordinary white field peas, and our farmers are still growing them in large quantities. They could and formerly did grow the large garden peas but gave them up as they were too troublesome to harvest. This year we had magnificent crops of white field peas, and, as prices are high, it was undoubtedly the best paying crop farmers grew. It certainly appears that from some cause, whether it be from our very severe weather, or from some other cause, the Pea Weevil cannot live in our section. Our farmers have always made the small white pea a staple crop, and it is now growing largely in favour.'—A. A. WRIGHT.

'Toronto, October 25.—We find that our Montreal office has this season bought 40,000 bushels of peas in the counties of Renfrew and Lanark, which they worked for export via Montreal, and they advise us that the quality is very good, being practically free from bugs.'—JAMES CARRUTHERS & Co.

'Wellington, October 20.—Parts of the counties of Peterborough and Simcoe are free of the weevil. In Hastings county it does not extend north of Madoc.'—W. P. NILES.

Prof. Lochhead tells me that there is no sign of the Pea Weevil in the Manitoulin Islands, and the Algoma District. The same is almost certainly true of Nipissing, Parry Sound and Muskoka districts. The soil and conditions on Manitoulin Island are well suited for the cultivation of peas, and doubtless large areas will be found equally so in the other districts mentioned, as the country becomes settled up more thoroughly.

The three chief Enemies of the Pea.—There are three distinct insects which have caused excessive losses in the pea crop of recent years and there is still some misunderstanding among farmers and seedsmen as to what exact insect is intended by the name 'Pea Weevil,' and some again have protested that the name 'Pea Bug'

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is preferable because better known in the trade for what students of insects call the Pea Weevil; a few have even insisted that the Pea Weevil is what is really the Pea Moth. The name Pea Weevil, as applied by entomologists, is undoubtedly the correct name for the short roundish hard beetle which is found among seed peas from which it has emerged, leaving a perfectly round hole in the hollowed out pea where it passed its preparatory stages. This insect is shown enlarged and of the natural size at figure 2. The name Pea Weevil is claimed by entomologists to be correct for this insect, because it belongs to a family of beetles the technical name of which is weevils, and, moreover, it has always been known for nearly a hundred years by this name. There is, however, no particular objection to the use of the trade name Pea Bug, notwithstanding its inaccuracy (the insect not being a bug, nor in any way resembling one), because there is no true bug which is a serious enemy of the pea, and therefore no confusion arises from speaking of the Pea Weevil as the 'Pea Bug.' The Pea Moth, shown at figure 3 in the perfect form, which, however, is

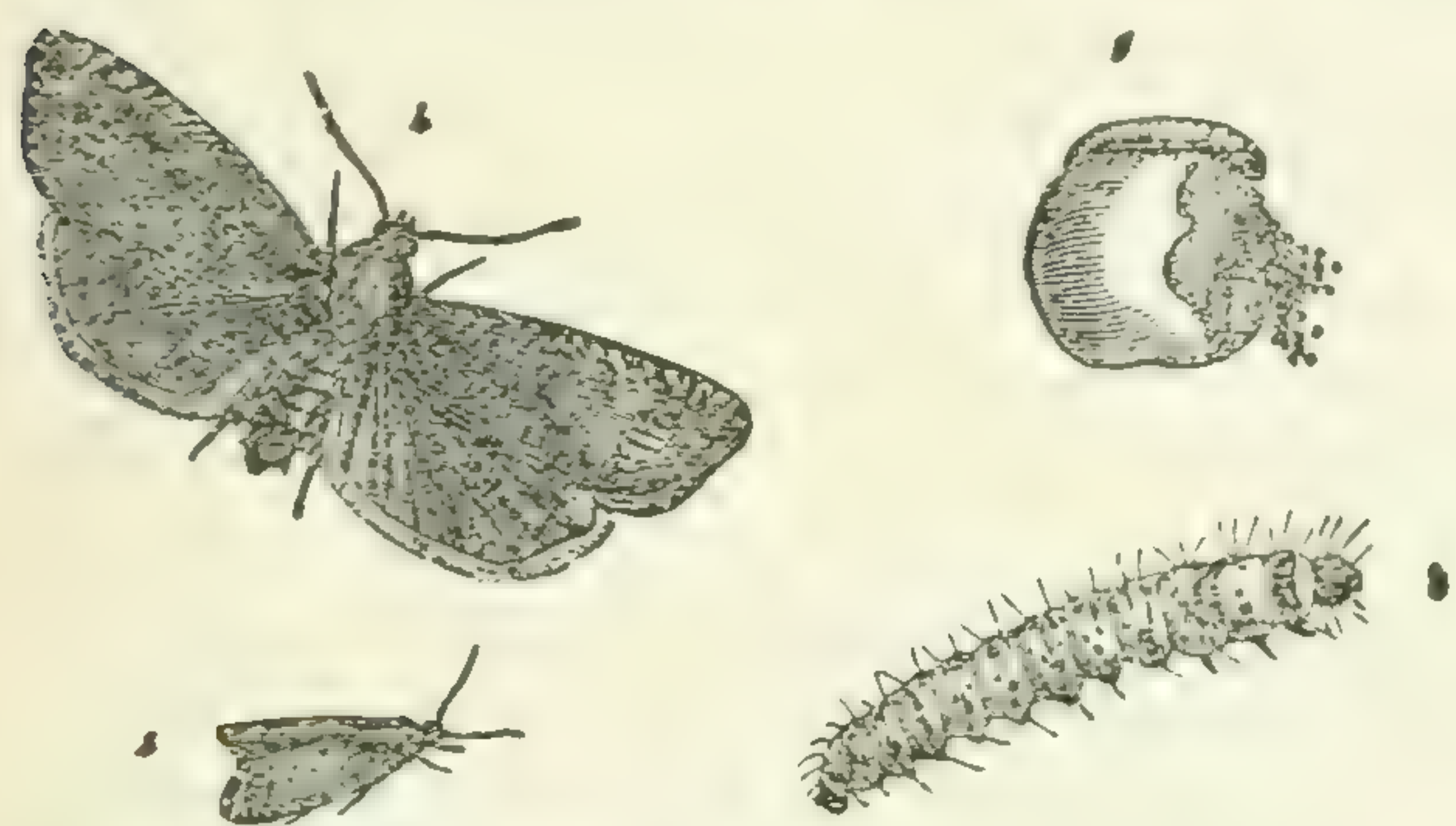


Fig. 3.—The Pea Moth: caterpillar and moth—
2 and 4 enlarged.

very seldom seen, is a small slaty-gray moth, three-eighths of an inch in length, resembling somewhat in markings but not in colour the Codling Moth. This insect is generally seen by pea growers when in the caterpillar state (figure 3: 1 and 2), when it is usually called 'the worm,' and frequently does a large amount of injury to the pea crop of Canada, chiefly, however, in districts lying east of the area infested by the Pea Weevil and increasing in severity as the Atlantic sea-board is reached. The small white caterpillars live inside the green pods, attacking the

peas by gnawing ragged-edged cavities into them and filling up the pod around their cavities with a mass of excrement. As this insect is less known to pea growers and seed merchants than the Pea Weevil, and as the name Pea Weevil is also somewhat comparatively new to them, it having only been brought prominently forward during the last twenty years, during which efforts have been made to counteract insect attacks, I think it probable that the confusion which has arisen in the minds of some who have not studied insects, and who have applied the name Pea Weevil to the Pea Moth, has been due to their having applied the unfamiliar name Pea Weevil to the unfamiliar insect which they knew was not their 'Pea Bug,' with which they were well acquainted.

The third insect which has drawn attention by the extent of its injuries and which like both of the above is frequently spoken of as 'the bug,' is the Destructive Pea Aphis, which is a soft-bodied plant-louse about $\frac{1}{4}$ of an inch in length and expanding about $\frac{1}{2}$



Fig. 4.—The Destructive Pea Aphis: winged
viviparous female—enlarged 6 times.

of an inch when the wings are opened. This is pale bluish green in colour with the legs darkened at the joints and with very long honey tubes at the end of the abdomen. The Destructive Pea Aphis appeared suddenly for the first time in the summer of 1899, and practically ruined the pea crop over large areas in the United States and Canada. Since that time it has become less in numbers and during the past season was only reported in a few places upon late peas and upon sweet peas in gardens. Perhaps the worst attack was upon Grass Peas which were much belated this season and upon

Hairy Vetch and field peas which had been sown for ploughing down as green manure. To recapitulate, the Pea Weevil or 'Pea Bug' (Fig. 2) is a small beetle, the grub of which lives inside the pea until fully developed, and the beetle emerges in autumn or the following spring through a perfectly round hole.

The Pea Moth (Fig. 3) is a small gray moth, the caterpillar of which lives until full grown inside the pod, gnawing into the green peas. It then eats its way out of the pod and passes the winter in the ground inside a silken cocoon from which the moth appears the following summer. For this insect, treating the seed is useless.

The Destructive Pea Aphis (Fig. 4) is a soft bodied plant-louse or 'green fly,' which clusters in large numbers on the young shoots and stems, sucking the sap and enfeebling the vines so that they die before maturity.

Difficulties.—It must be acknowledged that, almost without a dissentient voice, my correspondents claim that the only way to bring about the extermination of the Pea Weevil, is to give up the cultivation of peas in Ontario for two or three years, and that this action should be enforced by legislation. Notwithstanding this, after considering the question in all its bearings, I cannot agree that this course would be calculated at this stage of the campaign to produce the surest results. The cessation of pea growing, to be effective, would have to be absolute, not only in every part of Ontario but also in all the United States where peas are grown for seed; and this, not merely by large pea-growers and farmers, but by every private individual who wished to grow peas for his table or for the market. At the present time, while peas are an unremunerative crop in the worst affected districts, this is not the case over large areas in northern Ontario, and, while it might be possible to induce large growers in the south-western counties of the province where pea-growing is now unremunerative, not to sow peas, it would be very difficult to persuade growers to do so north of the line mentioned above as running from Kincardine through the province to Brockville; and the difficulties in the way of persuading private gardeners from doing so seem insuperable; yet, for this measure to be of use so as to starve out the Pea Weevil, not a single patch of peas should be sown, in which the insect could propagate. Theoretically, this, at first sight, seems to be a perfect remedy, and I doubt not would prove to be so, were it in any way possible to enforce it. The chief difficulties are that every one would have to give up growing peas absolutely, not only in Canada but in the adjoining States. There is no set line which could be accurately defined as the limit of the area where the insect would breed, even if partial legislation were contemplated. Private gardeners are not yet well enough informed nor sufficiently interested for all to make the necessary sacrifice of giving up such a favourite vegetable as green peas, nor are all the gardeners in any district energetic enough or provident enough to pull up and destroy all their pea vines as soon as the crop fit for the table is gathered. That this is the proper course, is undoubted, and the land, where peas have been grown, may in most parts of Ontario be cleared of pea vines by the end of July and planted to late carrots, beets or cabbage. From special observation for several years, I have seen that a far more usual practice in gardens, is to leave the pea vines standing long after the crop is gathered and until many of the pods are perfectly ripe, which, in the Pea Weevil districts, means until the weevils are fully developed.

Legislation upon all matters affecting a large proportion of the community is only a last resort, and as a remedial measure. Legislation on agricultural matters, moreover, has always been unpopular, and, unless it can be enforced, is worse than useless. The legislation affecting noxious weeds can hardly be considered successful even in many parts of law-abiding Canada.

That a vigorous campaign against the Pea Weevil is now necessary, is abundantly evident to all who know the value of the pea crop, and wish to preserve the reputation of Canadian peas and the export trade of this valuable commodity; but it seems to me that what is now most necessary and fitting, as looking to ultimate victory against this foe, is a campaign of education. The ordinary pea-growers, or even the large grain merchants, do not know sufficiently the nature of their enemy, its natural history and distribution. There is even confusion as to which of the several insects which attack the pea, actually is the Pea Weevil. All this uncertainty should first of all be done away with through the ready means at our disposal. The federal and provincial governments have published reports and bulletins, and intend to publish more: the agricultural and public press of the country are always willing and eager to publish

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articles or answer inquiries concerning matters of public interest. There are effective, sure remedies for the destruction of the Pea Weevil, and if growers can be made to understand this and see that by adopting them, even at some small trouble, they will greatly benefit themselves, while by neglecting them they will injure themselves and their neighbours, I have confidence enough in the common sense of Canadian and American farmers, to believe that they will adopt them.

These remedies will be explained and brought prominently before all who attend Farmers' Institute meetings in Ontario during the coming winter, and object lessons will be given during next summer in the pea-growing districts, but even these efforts will only reach a comparatively small number of those who are concerned, and every effort must be made to bring the importance of the matter before the country. The Boards of Trade in Toronto and Montreal have had it under serious discussion. The press of the country have done much and can and will do much more. In my official capacity I shall do my utmost towards what I believe is possible, the extermination of the Pea Weevil in Canada, and, if United States workers will co-operate with Canadians, success is assured.

Under the head of remedies I shall mention what have proved to be the best means of destroying the Pea Weevil, and at the same time shall endeavour to anticipate the difficulties which may be expected to arise in the adoption of each.

REMEDIES.

Cessation of growing.—The Pea Weevil has no other known food plant than the cultivated pea; therefore, as this plant will not stand our winters, there is never a volunteer crop a second year, so, if no peas are sown, the pest must die out. The difficulty in this case is the impossibility of getting everyone where seed peas are grown liable to infestation, to give up their cultivation. In the present season seed merchants have already laid in their supplies of seed peas for next year's sowing, and there would be great loss to them, were these high-priced peas ground for feed.

Fumigation.—Fumigation with bi-sulphide of carbon is a sure remedy. When properly done, either in specially constructed buildings known as 'bug-houses,' or in any tight bin, every Weevil is surely killed if the seed containing them is subjected for 48 hours to the vapour of bi-sulphide of carbon used in the proportion of 1 pound by weight of the chemical to every 100 bushels of seed, or in smaller quantities, 1 ounce of bi-sulphide to every 100 pounds of seed. The discrepancy in the quantities given above is due to the fact, that where large quantities are treated at once in specially prepared houses there is less waste of the vapour during the necessary exposure of 48 hours. The quantity given above of 1 pound to every 100 bushels is that which is regularly used by the large seed houses, some of which fumigate from 1,000 to 3,000 bushels at a time. The bi-sulphide of carbon should be of the best quality which will vaporise without any residue, and the exposure should be for the full 48 hours advised. This treatment should be done as soon as possible after harvesting, but may be done at any time when the temperature is above freezing. It is important that the bi-sulphide, which vaporizes readily at the temperature mentioned, but more quickly the warmer it is, should do so as soon as possible, so that the heavy and deadly vapour, which is much heavier than air, should sink down among the peas, where it will in 48 hours kill every weevil in the grain. To facilitate the evaporation it is usual to place the bi-sulphide in large shallow dishes at the top of the building or bin. As the vapour is very inflammable, this work must be done at a distance from other buildings, so that there may be neither accidents nor trouble with insurance companies. No lights of any kind, and no smoking must be allowed near the buildings where bi-sulphide of carbon is being used. This liquid is not more dangerous than naphtha or benzine, but the danger of these is better known.

For the treatment of small quantities of seed, particularly by farmers, I have found that an ordinary coal oil barrel is very convenient. This will hold about 5 bushels or 300 pounds of seed, which may be treated with 3 ounces of bi-sulphide of carbon. Care

must be taken to close up the top tightly. This is best done with a cap made specially for the purpose, but may also be done with fine sacks laid smoothly on the top, over which boards are laid, with a considerable weight on them to hold the covering down closely.

Fumigation with bi-sulphide of carbon, I believe, is the remedy most to be relied on in this campaign. It is perfectly effective, is now regularly used by the large seed merchants, and in future will be much more regularly used. The liquid is cheap, in large quantities costing about 15 cents a pound, although small quantities are charged for at a higher rate, owing to its inflammable nature and nauseous odour, which make it an undesirable stock for druggists to keep on hand. The treatment is easy so that no mistakes need be made, and, with ordinary care, accidents are not likely to occur. As a matter of fact, I have never heard of an accident from the use of this chemical.

Bins for fumigating with bi-sulphide of carbon should be rendered as nearly air tight as possible. This may be done in the case of an ordinary bin by pasting sheets of paper over the inside, and, in case these should be liable to be torn, over the outside as well. Where the lid fits down it should be padded with felt.

Holding over Seed.—Where only a few seed peas are used, a most reliable remedy is the holding over of seed until the second year. Peas should always be bagged up and the sacks tied at once after threshing. The weevils are not able to eat their way through the bags, even when these are made of paper. All the weevils which emerge either in autumn or the following summer will perish inside the bags, and the seed can be sown the following year without danger. The very rare instances which I have heard of, but which I have never seen, where weevils remain alive in the peas and emerge during the second summer after the peas ripened, must be of such rare and exceptional occurrence that they need not be considered. However, to make assurance doubly sure, the seed grain may be kept in a warm room or house during the first winter when there is hardly a possibility of the beetles not emerging.

Treating with Coal Oil.—A remedy which has been used by many farmers with satisfaction, is to drench the seed with coal oil using about half a gallon to a barrel or five bushels of peas. Half of this quantity however can be used successfully as I have been informed by Mr. W. M. Real of Greenbank, Ont., who writes as follows: For several years I used coal oil on part of my seed with good results. An ordinary bin or a large box will do for, say 50 bushels or less; for every 20 bushels pour over them one gallon of coal oil, spreading it so that it does not run to waste. This should be done about two weeks before sowing. Immediately after putting on the oil, the peas should be shovelled over and over so that all will be oiled, and the shovelling must be repeated every day for four or five days. This, if properly done, will kill all the bugs in the peas without injuring the seed. This plan, however, is no good when you compare it with the fumigation mentioned on p. 210 in the report you sent me which is so much easier done. The remaining part of my seed has been fumigated, only I do not use barrels because we have two bug-houses near here, and we can kill all the bugs in 400 bushels at once without emptying them out of the bags. This too is far safer than using bi-sulphide around farm buildings.'

Mr. Wm. Ross, M.P., of Port Perry, who has taken much interest in this matter of controlling the Pea Weevil tells me that he knows of many in his district who use the above coal oil method with great success.

In my own experiments I found that peas treated with coal oil, if not planted soon afterwards, were slow in germinating. This, however, only points out the advantage of oiling peas just before sowing, and this method has a special use as an emergency remedy when, as is frequently the case seed peas are found after purchase to contain living weevils.

Scalding Seed.—Of the same nature, when peas are found at the time of sowing to contain weevils, is scalding the seed. This may be done by pouring them into scalding water and then either pouring the water straight off them again or cooling off immediately with cold water.

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RECOMMENDATIONS.

Loss by sowing Weevilled Peas.—That seed peas which have been bored by weevils are very seriously injured, I have proved by actual experiments during the past season and previously. Weevilled small peas in the past season, which was very advantageous for growth, gave only from 13 to 20 per cent of plants, which bore pods, and these were all weaker than plants from perfect seed. Large peas gave a better percentage of from 16 to 28 per cent. Therefore, weevilled peas should not be used for seed if any other stock is obtainable. If, however, this is impossible, much more seed should be sown to the acre.

Suggestions.—The present time must be considered as a crisis in the Canadian pea market, but I feel sure that much may be done to relieve the situation. This must be done, I think, not by legislation or by giving up the cultivation of such an important crop as peas, which we cannot well do without, but by persuading everyone who sows peas to abstain from sowing any peas which contain living weevils; when purchasing seed, to refuse determinedly to buy any without an assurance that they have been treated, and further, even with this, to examine for themselves to see that any contained weevils are really dead. I would also point out that, from the experiment already cited of growing peas from weevilled seed, such seed is only worth about one quarter as much as sound seed. To secure a supply of seed peas free from weevil injury, it will be necessary for growers and farmers to handle their crop a little differently than has been the usual practice. The injury is of an exceptional nature, and exceptional measures must be taken to avoid loss.

There are, however, special features about this attack which render its control a simpler matter than is usually the case with injuries of an equal magnitude. The Pea Weevil is not a native insect and has no native food plant, in which it could propagate, were there no cultivated peas. Indeed, it is so restricted in its food habits that no other food plant is known than the different cultivated varieties of true peas, belonging to the botanical genus *Pisum*. These peas will not live over the winter in our climate if left in the open field, at any rate, in any part of the country where the Pea Weevil is known to breed, consequently, every seed pea sown for crop must, at some time before it was sown, have been under the control of some one by whom it could have been treated before sowing, to destroy the contained weevil, if it had one. The remedy is effective, easy and cheap, is well known and can be applied by anyone. If all growers would combine and do this, the larger number of the weevils would be destroyed in a single year. This, however, would not be sufficient, because a certain number of the insects sometimes leave the peas during the autumn when the seed ripens, and this sometimes before the peas are carried from the fields. This fact is the one great difficulty in arriving at a perfect remedy, but I do not believe that it is insurmountable. There is every indication that a much smaller percentage of weevils left the seed in the autumn of 1902 than is frequently the case. The suggestions I have to offer are briefly as follows :

(1.)—That all peas for seed should be treated before they are sown to kill the weevil and that seeding should be done as early as possible, so as to get them ripe enough to harvest earlier than is the usual custom.

(2.)—That pea growers should harvest their peas as much on the green side as is safe, rather than as is usually done now, when they are dead ripe, and thresh and treat them themselves or sell at once to grain buyers. This has many advantages. Not only is the straw of very much higher quality for feed, but the seed is heavier and better for every purpose, for export, for feed and also for seed, because it is of higher germinating power, and further, because the weevil at that time is much less advanced in growth and consequently has destroyed a much smaller proportion of the bulk of the seed. The average dates for pea harvesting are from July 20 to August 20. I have no record of the Pea Weevil becoming mature and leaving the seed before August 15, and it is usually

much later than that date. Experiment has shown that the weevil at all stages may be killed inside the peas by fumigating the seed with bisulphide of carbon, consequently, if growers will harvest and thresh earlier than usual for a few years and either themselves treat their seed immediately or sell to the grain buyers, who for their own sakes will do so, much good must surely result. When for any reason peas cannot be treated at once or disposed of, they should be bagged up and the sacks tied immediately so as to prevent the escape of any weevils which might emerge in the autumn. When the grain is required for feeding the peas should be ground as soon as they are dry enough, and to prevent the meal from becoming musty the new peas should be mixed with some old peas when grinding.

Difficulties to be met.—Sometimes peas ripen so unevenly that by reaping early it is feared that the sample will be very uneven when threshed ; but, should this be the case, it simply means that these small and shrivelled peas are blown out of the seed peas when they are cleaned and are not lost but can be used for feed. The greatest difficulty of all is with regard to the peas which are shelled out in the field at the time of harvesting. This however, will be to a large measure obviated by reaping early, as the seed will not shell out nearly so much as when left till the regular time. The cleaning up of pea fields moreover by turning in hogs is a generally recognized practice, and the work is done very thoroughly. Where hogs are not available, poultry will do the same work, and, where neither of these can be used, the land should be ploughed so deeply that the weevils cannot work their way out when they leave the peas. I am aware that it is not the custom to plough up pea fields for fall wheat, but simply to cultivate or disc them, because the land is left in such excellent condition ; but it must be remembered that the loss from the Pea Weevil is now excessive, and, if this small change in method can be shown to be of great advantage, it surely is worth a trial.

Another difficulty suggested is that it would be hard to get all peas threshed before the autumn emerging weevils escaped, on account of the small number of threshing machines which would be available. In reply to this, experience has shown that demand will always produce supply ; and I feel sure that the implement makers will not lose such an opportunity of pushing their business. The much higher price obtainable for the early threshed peas, to say nothing of the enormous value of future crops due to controlling the weevil, will very soon repay to the farmer the initial expense. Where, however, there is no possibility of getting a threshing machine, I would draw the attention of growers to the old-fashioned method of treading out the peas with horses. That this is advantageous is indicated by the fact that some of the seed merchants pay a higher price for peas threshed with horses.

Mr. W. P. Niles, of Wellington, to whom I am particularly indebted for much useful information connected with this matter, writes me particularly with regard to one subject which is much discussed by the Pea Trade, viz., 'oily peas.' Mr. Niles writes : 'My sample No. 4 contains what we designate as "oily" or "glassy peas." Every one, you will notice, has had a weevil in it, and not one of these peas will germinate. Some seedsmen say this is caused by the heat of the sun in dry weather killing the weevil while in the embryo state, thereby making the pea oily. I contend that this is not the case, being perfectly satisfied that it is done by threshing with an ordinary threshing machine. At that time the weevils are not fully developed and are simply a small ball of fatty matter. The sudden shock in going through the cylinder of the machine kills or bursts this embryo weevil and the fat or oil is absorbed by the pea at once. In order to fully satisfy myself on this point, I have frequently had farmers thresh a part of their peas, the same variety on the same day, with a threshing machine, and a part with horses on the barn floor, and I have invariably found that the machine threshed peas would have a large percentage of oily peas, while the horse threshed ones would not have any. I have tried this repeatedly for the past three years, and have always got the same results.'

With regard to the above, I may say that some seed merchants do not agree with this theory ; but I received from Mr. Niles a large number of oily peas. These I soaked for two or three days and opened them carefully, when I found that the weevils were

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nearly all in the pupal condition, and that in every case these had been broken in some way; and the oiliness was apparently due to the fat of the body running between the two halves of the pea and saturating the skin. If it be found by others that peas can be threshed with horses conveniently and that they get peas which are worth five cents a bushel more, which is the price offered by Mr. Niles in his last circular to growers, this may be an inducement to thresh at once and not wait for the threshing machine.

Substitute Crops.—In those localities where the cultivation of peas has been abandoned, there is a constant demand for advice as to the best similar crop to grow as a substitute. Of the leguminous or nitrogen-collecting plants, perhaps the most popular is the pea-like plant known by the name of the Grass Pea, or Chickling Vetch (*Lathyrus sativus*, L.). This has been largely grown and has given considerable satisfaction in certain sections. It is not favoured by the grain merchants, because there is no demand for it for export; but, when grown for feed, it has given such satisfaction that in some counties of western Ontario it is used for all purposes for which field peas were formerly grown. It is also claimed to give a crop of excellent seed entirely free from the Pea Weevil, of from 10 to 30 bushels to the acre. The season of 1902 was not at all suited to the best development of this plant, but it should not for this reason be condemned. Messrs. John A. Bruce & Co., of Hamilton, Ont., who have handled much of this grain, inform me that 'the Grass Pea has been grown to a limited extent in Wentworth, Lincoln and Haldimand for half a century or more, and the acreage has been largely increased the past three seasons, from its having been grown as a substitute for the field pea. This increased interest is due to the fact of its being bug-proof. The crop in this vicinity is a comparative failure this season. There was an abundance of vine but few peas.' This was a pretty general report from all sections, and, as stated above, the field crops in some places were attacked late in the season by the Destructive Pea Aphis. Other leguminous crops which may be grown instead of peas are tares or vetches, and various kinds of clover. Early varieties of Soja Bean have also given good results, and Mr. Zavitz, of the Ontario Agricultural College, strongly recommends farmers to grow the grain which formerly was grown in Canada under the name of Speltz, but which is now designated by its proper name of Emmer.

LOCUSTS.

Locusts or grasshoppers appeared again in Manitoba in the same districts as during the past two years, but, owing to the season, except in certain districts as around Sewell, the injury was not excessive. They appeared early in May, and Mr. H. McKellar, who

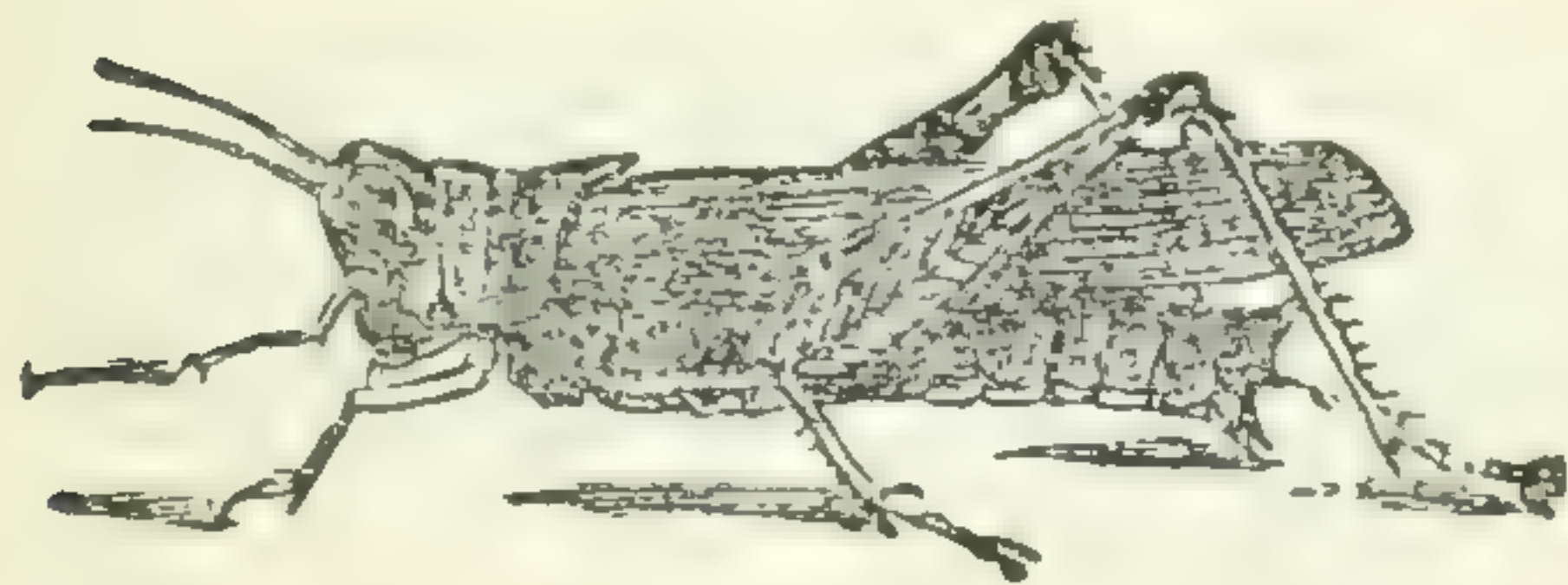


Fig. 5.—The Common or Red-legged Locust

is well informed on the subject, at once published articles in all the Winnipeg newspapers, advising farmers in infested localities what to do to counteract their attacks. Later in the year the crop of the province was so enormous that little was heard of their depredations, at the same time, where careful observations were made, it was abundantly evident that Manitoban farmers will require to be on the alert and be prepared

in ordinary years to follow the example of those farmers who have saved their crops in the worst districts by practising the methods which have been advised. Mr. Norman Criddle, of Aweme, has continued his experiments in the use of poisoned mixtures. His experience during the past season in improving these is of so much importance to farmers who may have their crops attacked by locusts, that I reproduce in full a valuable report which he has sent me. This is equally applicable in Manitoba and in the other provinces. Considerable injury was done by grasshoppers in some sections of Ontario in 1902, and I would earnestly urge Ontario farmers to try the Criddle mixture described below, should these insects again appear next year. I have seen on several occasions the beneficial effects of this treatment and commend it most heartily. It should be applied promptly on the first appearance of grasshoppers in undue numbers.

The injury to clover crops in autumn by these voracious insects is often far more serious than is generally appreciated. Grasshoppers are susceptible of being driven in large numbers to the edge of a crop by drawing a rope across the top of it, the two ends being held by two persons walking across the field. The poisoned mixture can then be scattered on the bare ground at the edge of the crop to which they are driven. They will eat this ravenously and vast numbers will be killed.

MR. CRIDDLE'S REPORT.

AWEME, MAN., November 9, 1902.

According to your request, I have prepared the following notes on the locust pest for this year, at Aweme and the surrounding places.

Locusts, on the whole, were decidedly more numerous than last year, especially in places where they had not been poisoned the previous season; but, owing to cold wet weather in the latter part of April and the beginning of May, the first did not make their appearance until May 7, and the bulk until the 26th, nor did they begin to do damage until the end of the month. A succession of rains during June greatly retarded their growth and saved a considerable amount of work in fighting them, as they do very little eating during wet weather.

On June 20, the first were noted with wings. By July 7, half could fly; by the 11th most of them had wings, and they began migrating. The migratory season continued until the 30th, at which date the first eggs were being deposited. On August 12, eggs were deposited for the second time. After this date eggs were being continually laid until all the locusts died. They began to die off the latter part of August and had practically all disappeared by September 20, a few remaining until the middle of October.

In this season, as in 1900, locusts hatched out on the prairie in considerable numbers wherever the ground was at all light or sandy. In fact, along the tract of country lying between this place, Sewell, Carberry, and almost to Stockton, they were nearly as plentiful as on the stubble fields; but all those said to have hatched on the prairie of the so-called heavy land, had in reality come from old gopher hills and other bare spots. Unlike other years a large number hatched on heavy clay land, even after they had been under water for some days.

The chief damage done, was during the migratory period, by the locusts eating the heads of grain, principally, however, owing to an erroneous notion among certain farmers that it is useless to fight them after they can fly, and also because of a shortage of Paris green at that time. With us very little damage was done (possibly a few bushels lost during July).

The locusts responsible for damage at Chater, Douglas, Blyth, Aweme, Treesbank, Stockton, and almost to Wawanesa, consisted mostly of the Lesser Migratory Locust (*Melanoplus atlantis*) a fairly large proportion of Packard's Locust (*M. Packardii*), a few of the Two-lined Locust (*M. bivittatus*) and the Rocky Mountain Locust (*M. spretus*). The latter were noted principally west of Treesbank.

The only noticeable parasites or insects preying upon locusts that increased during the summer, were several species of ground beetles (*Amara*) and blister beetles. These latter were noticeable in fairly large numbers throughout most of the districts mentioned above; and here they have almost entirely exterminated the eggs in patches. The only species seen in large numbers were a small black species, *Epicauta pennsylvanica*, and a slightly grayer sort *Epicauta sericans*. A small amount of damage was done by these blister beetles to potatoes and beans; but, as a rule, they prefer the wild peas or vetches to any thing else. Tachina flies affecting locusts seem to have almost entirely disappeared during this season; but the Locust Mites were about as numerous as usual.

With regard to the strength of Paris green mixture, I had not much time to experiment personally at home; but experiments conducted by my brother, Evelyn Criddle, show that undoubtedly 60 parts horse droppings can be used to one of Paris green (by measure), and probably 75 parts. Whether it can be made yet weaker, as you surmise,

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is yet to be found out. Several people who have used it as above, report it is not strong enough. The great difficulty is to thoroughly mix the stuff; this is best accomplished by mixing the Paris green in water first. Though I still recommend salt, yet I believe with fresh droppings it may be unnecessary. The poison mixture has been found much more effective when spread during hot sunny weather.

In conclusion, it is perhaps hardly necessary to add that the Paris green mixture has proved an unqualified success wherever persisted in and used according to directions, and that it is far ahead of any other remedy which has been tried here after the locusts have once hatched. My statement in your 1900 Report that locusts eat the poisoned mixture more eagerly when they are old than when young, has not been borne out by recent observations: in fact, I now see that it is somewhat the other way.

NORMAN CRIDDLE.

As to the remark made by Mr. Criddle that some reported the mixture of 1 part of Paris green in 60 of horse droppings as not being strong enough, I believe that these observers were mistaken, and that the misapprehension arose from the fact that Paris green is a slow acting, although a very fatal poison. I have found dead locusts which had plainly been killed by this mixture, fully 100 yards from where the poison had been distributed around the edge of a crop. Mr. Criddle found that a simple way to keep locusts on the edge of a field of wheat is to sow a strip of rye around it. This grain grows much more rapidly than wheat, and takes a lot of eating down to kill it. By this means the insects are held where they are easily poisoned.

The plan which has been found most convenient for distributing this poisoned bait is described in my 1901 report. The Criddle mixture, as recently modified, consists of 1 part of Paris green, mixed thoroughly in 60 of fresh horse droppings to which 2 lbs. of salt per half barrel of mixture have been added after being dissolved in water. This is placed in a half barrel and drawn on a cart to the edge of an infested field or one likely to be infested. The mixture is then scattered broadcast along the edge of the crop by means of a trowel or wooden paddle. The locusts are attracted to it from long distances and are killed in large numbers by eating the poison.

FRUIT

THE SAN JOSE SCALE

(*Aspidiotus perniciosus*, Comst.).

During the summer of 1902 a great many experiments have been tried looking to the discovery of a practical remedy for this most pernicious insect. The results obtained by Mr. Geo. E. Fisher, the Provincial Government Inspector, have been most gratifying. Mr. Fisher has supplied me with the following report:—

‘Freeman, Ont., Nov. 29.—I have much pleasure in sending you as requested a report of what was done this year in working out remedies for the San José Scale, but have little to add to what you have seen yourself in the orchards where these experiments were carried out. This has been altogether the most satisfactory year I have had in scale work, and I feel very much encouraged, not only by the results obtained, which indicate that the scale may be perfectly controlled regardless of conditions in surrounding orchards, but also by the many letters I have received from friends who have seen the results.

‘In the experiments I used whale-oil soap in various forms, crude petroleum in a variety of ways, and lime and sulphur with and without salt, and in different proportions in winter. Fumigation and crude oil emulsion in winter and summer, and kerosene emulsion in summer. Other remedies were tried but with less satisfaction.

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'The whale-oil soap distributed this year was a very superior article and contained about forty-five per cent of oil (said to be pure cod) and twelve and a-half per cent first sorts caustic potash. The cost, delivered, was four cents per pound, and from my experience in buying soap I conclude the manufacturers will not supply a really good soap for less money. This makes a mixture suitable for treating scale, cost 10c. per pound. The effect of this soap in reducing scale was very good for soap; but I have not found soap so fatal to the scale as some of the other remedies. There is a serious objection to soap on account of its killing the fruit buds if used early and before the frosts are over. The Catawba Island people say that a cold east wind coming up off the lake on trees treated with soap will kill most of the fruit buds. This quality, together with its excessive cost, stands in the way of soap being extensively used. Speaking in a general way, there is no certainty of what soap contains. A manufacturer may turn out an inferior article, and the farmer will know nothing of its defects till the breeding season of the scale, when swarms of larvæ will tell the tale. To meet this difficulty I prepared an emulsion of fish oil and potash, using 5 quarts of fish oil and $2\frac{1}{2}$ to 3 lbs. of potash in 10 galls. of emulsion, which is easily made and will hold, with the same quantity of soap as is used for kerosene. As a remedy for scale, this is fully equal to soap and costs $\frac{2}{3}$ the price.

'The question is frequently asked "Is it the potash or the oil in soap that kills the scale?" and to settle this I made an emulsion of 5 qts. of fish oil in 10 galls. of emulsion which worked very well. When used at three fourths strength and even at half strength, plentifully applied, the result was really good. A solution of 3 lbs. of potash in 10 galls. had no apparent effect in reducing the scale. Others report better results from potash, and I will try it again next spring, but the results obtained last spring were very poor indeed.

'Crude petroleum was used diluted and undiluted, with and without soap, in the form of a mechanical mixture applied with a combination pump, and also as an emulsion prepared with soap and applied with an ordinary pump. Undiluted crude oil may be applied to peach if a very fine nozzle be used with an orifice of, say $\frac{1}{16}$ to $\frac{1}{32}$ of an inch in diameter and the least possible quantity put on a tree to cover it; but the risk is too great for it to be recommended generally. A nozzle having an opening larger than $\frac{1}{32}$ of an inch in diameter, is too coarse for applying undiluted crude oil; and, even if it be diluted, a fine nozzle gives the operator more time to look over his work and be sure of what he is doing. With a coarse nozzle a heavy treatment is given before one knows it, and sometimes part of a tree is heavily treated and other parts insufficiently. Most people do not discriminate between a large and a small quantity nor between weak and healthy trees, and very little crude oil will kill weak peach trees. The effect of soap combined with crude oil, is to lessen its injurious effects on vegetation, and when used of the strength of $\frac{1}{4}$ lb. of soap to the gallon of water with 20 per cent of oil, it reduced the scale well without seriously injuring peach trees. Crude oil in any of the above mentioned forms will prevent re-attack, and I think there is a strong tendency on the part of the scale, when oil is used, to go out on the young growth and the fruit. Mr. James Samson, of Niagara, used crude oil last spring undiluted, with one of my fine nozzles so successfully that he now declares in favour of undiluted crude oil for everything. He sprayed some peach but did most of his spraying in his apple orchard.

'The lime and sulphur wash was used in a variety of ways, with and without salt, and in proportions varying from $\frac{1}{2}$ pound of lime to 2 pounds to the gallon of wash. We generally used half as much sulphur as lime by weight, and found about 1 pound of lime and $\frac{1}{2}$ pound of sulphur to the gallon of wash to work out best and have the best results where no salt was used. Of course my limited experience with this does not justify my speaking with confidence as to details, but I think thorough cooking is imperative—two, three hours, or more—and besides the trees should be sprayed until the bark is entirely covered. A tree should first be sprayed with reasonable care; after it is dry, it should be gone over a second time, and any missed parts covered. In this way a very perfect treatment is given, which is so important in the case of this scale. Lime and sulphur is safe to use on dormant trees, but, if applied very strong and very late when the buds are opening, it may injure the soft young growth in the heart of the tree, which, however, is really no injury. I have never noticed any bad effect elsewhere.

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Trees treated with lime and sulphur bore very heavily, much more so than trees treated with any other remedy. It is the most effective spray and the cheapest, and with a steam boiling plant, the most easily procured. From the best information I can get, long boiling is important, and this enhances the value of the steam process. Where this wash was tried by the farmers, it is highly spoken of, and will be used much more extensively next spring. The effect on the trees is fine, and the crop of fruit has been good in all cases where it was used. To be able to treat badly affected trees whenever they are found in summer is greatly appreciated by those who are making an honest effort to control the scale.

'Kerosene emulsion used in the proportion of 1 gallon of kerosene in 6 of emulsion for apple, pear and plum, and 1 in 7 for peach, applied in dry hot weather, has just about cleaned trees that were very badly affected. This really looks as though kerosene emulsion were all that is required to control the scale. I much prefer to use kerosene emulsion when it is perfectly fresh, that is, newly made, and to have the soap and water actually boiling when it is thrown in on the oil to emulsify it. The lower grade of Canadian kerosene has served the purpose best. Use kerosene emulsion always in dry hot weather and not at all in winter.

'I like fumigation for trees of moderate size. The effect is complete if the work is done in moderate weather with gas of normal strength, that is $\frac{1}{4}$ gramme of cyanide to the cubic foot inclosed—exposure 45 minutes; but this strength does not appear to be sufficient during low temperatures. One-tenth of a gramme with an exposure of 30 minutes, and one-seventh of a gramme with an exposure of 20 minutes apparently did perfect work in July in the day time without injuring peach foliage. The experiments in fumigation were not carried to any great length, and, although they were carefully watched duplicates might show differently. They are very satisfactory, however, to me.'

—GEORGE E. FISHER.

I have given the above report in full because I know of no one in America who has done more experimenting with the San José Scale than Mr. Fisher. I have had the privilege of inspecting his work frequently during the last three years, and have perfect confidence in his extreme care and great perseverance in solving any difficulties which may arise, either in his own active mind, or in the minds of any of the fruit growers in whose orchards he has worked. Mr. Fisher is a practical and successful fruit grower, a good mechanic and altogether one well suited to carry out the complicated and very varied experiments which he has done for the Ontario Government since his appointment. The results obtained are very satisfactory and may be summarized as follows:—

The San José Scale is an insect capable of more injury to orchards than any other we know of. It is extremely difficult to control with the greatest care, but with the necessary care trees may be kept in a thrifty and bearing condition without undue expense. This may be done with the following remedies:—

1. The ordinary kerosene emulsion, two treatments during the summer—an extra one may advantageously be applied in May just before the foliage is so thick that it is difficult to reach all parts of the tree—the first summer spraying in the middle of June, and the second one after the fruit is picked. Mr. Fisher says: 'Emulsions should always be used in clear weather, particularly kerosene emulsion, which gives much the best results when applied on warm, bright, airy days. A rather coarse nozzle is best for spraying trees in leaf, for the heavy spray from it splashes off the foliage and penetrates to the wood. The emulsions will probably not do more than afford temporary relief, but they will reduce the infestation well below the danger point and carry the trees safely into winter. This must be followed in the winter or spring by a thorough general spraying with lime and sulphur, which may be expected to work an almost perfect cure. In our experiments the results from this latter mixture after standing all the summer, are almost complete. Some trees on which it is difficult to find living scales, were before treatment heavily infested.'

2. Whale-oil Soap.—The potash fish oil soaps sold under the name of Whale-oil Soap are excellent insecticides and, when used of the strength of $2\frac{1}{2}$ lbs, of soap to the Imperial gallon, have done very efficient work in clearing trees of the San

José Scale, without the slightest injury to the trees. These soaps are much more expensive than the kerosene emulsion, and very much less troublesome to dissolve and apply than the lime and sulphur washes. For this reason they may be preferable for those fruit-growers who have a small number of fruit trees. They are useful against many other insects than the San José Scale, particularly the various kinds of other scale insects, the Pear Psylla, and some other insects which pass the winter beneath the flakes of the bark of fruit trees. The best time to spray trees is just before the buds burst in spring. The soap should be dissolved in hot water and applied as hot as is conveniently possible.

3. Fumigation.—A very effective remedy for small trees, but one requiring the use of very poisonous chemicals and somewhat expensive apparatus, is fumigation with hydrocyanic acid gas; hence, in view of the success which has been secured by the careful use of kerosene emulsion, I do not consider this a practical remedy for orchard use.

In addition to the above described work which has been done by the Provincial Government of Ontario towards finding a perfect remedy for the San José Scale, the greatest care has been taken by the Provincial Department of Agriculture that no nursery stock of any kind should be sent out by nurserymen which had not been thoroughly fumigated under government inspection. The Federal fumigation stations located at St. John, N.B., St. John's, Que., Niagara Falls and Windsor, Ont., Winnipeg, Man., and Vancouver, B.C., through which ports, only, nursery stock is allowed to be imported into Canada, have been in active service, and a great deal of nursery stock has been brought into the country. I have again this year the greatest satisfaction in reporting that there has been no complaint from importers as to the slight delay which must occur, nor as to any injury to trees during the necessary unpacking and handling for treatment. The superintendents at all the stations have done their work carefully and intelligently, and no single instance has been brought to my notice of living scales being detected on trees after passing through the fumigating houses, or of injury to them by the gas.

TWO NEW STRAWBERRY PESTS.

During the past summer complaints were received from British Columbia of the presence in injurious numbers of two different kinds of caterpillars, which have not, I believe, been previously reported as doing harm to cultivated strawberries in Canada. Specimens of the larvæ of both species were received from Mrs. C. E. Hickey, of French Creek, B.C. Writing under date of May 3, Mrs. Hickey, says: 'I send you separately some caterpillars. They have been doing considerable damage to our strawberry plants. Will there be another generation of them, and, if so, what should the plants be sprayed with?' The specimens mentioned arrived in Ottawa on May 12; seven of them had changed to the chrysalis state during the journey, but the others were still in the larval condition. These also soon changed to chrysalis, and the moths emerged in due course, and proved to be *Mesoleuca truncata*, Hufn., *a species not at all uncommon in British Columbia, and almost all other parts of northern Canada. The caterpillar of this geometer is a looper and when full grown measures about an inch in length. It is slender, cylindrical, in colour yellowish-green slightly glaucous, and has pale indistinct longitudinal stripes along the body, viz., a double dorsal band of more intense yellow than the body, a subdorsal band of the same colour, but clear white on the anterior segments, and a distinct yellowish ventral stripe. The tubercles on the body are white, and each bears a single short slender bristle. The head and feet are concolorous with the body. Beneath the anal flap on segment 13 is a pair of prominent slender tails, tinged with pink, each bearing a slender bristle at the tip. When mature the caterpillar changes to a chrysalis within the folds of a leaf or between two leaves, which have been drawn together by threads of silk. The larvæ which reached Ottawa alive, were put in a jar containing earth and some dried strawberry leaves. They did not enter the earth for pupation but changed to the chrysalis state as above. If these caterpillars should again prove troublesome in spring, the plants may be sprayed with Paris green or some other

*=*Petrophora truncata*, Hbn.

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strong poison before the flowers open, and again in September, as the eggs of the second brood are laid in August and the caterpillars feed through the autumn months, giving moths the following spring, if our form behaves in the same way as the species is said to do in England.

The other caterpillars received were cutworms, the species being *Scopelosoma tristigmata*, Grt. These caterpillars appeared in the strawberry beds nearly a month later than the above; though they were not nearly so abundant, they did some injury, and the occurrence is worthy of record. When mature, this caterpillar is nearly an inch and a half in length, and in general appearance is a smooth, cylindrical noctuid larva, in colour a velvety seal brown, shading to a crimson brown beneath, the centre of the venter being greenish. The head is dark reddish brown, with the exception of a broad upper margin of pale brown across the top, and reaching down the sides of the face to the ocelli. There are inconspicuous dorsal and lateral stripes, paler in colour than the dorsum, also a pale substigmatal band. Under the lens the whole skin above this band is seen to be covered with streaks and blotches of a darker brown than the skin. The thoracic shield is darker than the body and rather conspicuous. The anal shield is yellowish brown. The thoracic feet are shiny dark brown, and the prolegs are concolorous with the venter. The caterpillars entered the earth for pupation on June 23, and the moths appeared on September 17. In British Columbia this caterpillar has been found at Kaslo, by Mr. J. W. Cockle, feeding on wild raspberry. The usual remedies for cutworms may be applied if this species should again prove troublesome. Probably the most convenient in strawberry beds would be the poisoned bran mash.

THE APIARY.

The apiary, as in the past, has been under the sole management of Mr. John Fixter, whose report I append herewith. The season, on the whole, has not been a remunerative one for bee-keepers in most parts of Canada, although good yields are reported in some sections. In the Experimental Farm apiary the honey crop was fairly good and of excellent quality. The same experiments which have been carried on in the past, have most of them been repeated again during 1902, owing to the extreme interest which was evinced in them by visitors to the Central Experimental Farm. Experiments to prove that bees do not injure unbroken fruit were again carried out and with like results to those obtained last year, viz., that no injury is done by these useful insects.

During the past four years attractive exhibits of honey, mostly extracted and put up in neat glass jars, have been sent to various exhibitions. These have all been prepared by Mr. Fixter, and I learn from the commissioners of the different exhibitions that these exhibits drew much attention. The following exhibits were prepared: For Omaha, Nebraska, in 1898; for Paris, France, in 1900; for Glasgow, Scotland, in 1901; for Buffalo, United States, in 1901; for Wolverhampton, England, in 1902; for Cork, Ireland, in 1902; for Osaka, Japan, in 1903. Exhibits have also been prepared for the Ottawa annual exhibitions for some years past.

Mr. Fixter attended the annual meeting of the Ontario Bee-keepers' Association at Woodstock, Ont., and took an active part in the proceedings. He has also done good educational work in explaining the habits of bees and the way to care for them to large numbers of visitors who have come to the Experimental Farm during the past summer. He has, besides, delivered addresses upon bee-keeping to farmers and public school teachers and scholars when excursions have been held to the Experimental Farm.

REPORT OF MR. JOHN FIXTER.

SEASON OF 1902.

The honey flow of 1902 has been below the average in many parts of the Dominion, but in some localities in Ontario and Quebec fair crops have been secured. Stocks have been strong and active ; swarming has been good, in some cases excessive. The cool damp weather of the past season has been unfavourable, though some apiarists had a fairly good honey crop. The yield, however, will not average over 40 pounds per colony.

The season opened very early ; the colonies were set out on their summer stands on March 22, the temperature on that date being 55° and the day clear, bright and mild. There followed about ten days of very fine weather for the bees to fly and cleanse themselves and their hives. Pollen was gathered about April 1, and all colonies built up rapidly and were in excellent condition when clover bloomed. May 25, many colonies were showing signs of clustering ; so, supers were put on to keep them working and keep down swarming. June 18, considerable honey was stored in supers and brood chambers. On June 18 the first swarm of the season issued. During the swarming season many swarms came off at the same time and were hived two or three together, so as to keep down the number of swarms. There being very little buckwheat grown in this district and no fall flow from any other source, all supers were removed on August 15. September 1 all colonies were weighed ; any that did not weigh 50 pounds and over were given sugar syrup made with granulated sugar fed in a Miller feeder. On November 18 all colonies were weighed and found to be in good condition. They were then put into their winter quarters.

Returns from the Central Experimental Farm apiary averaged 40 pounds per colony.

EXPERIMENTS WITH DIFFERENT KINDS OF HIVES.

The experiments commenced last year with different kinds of hives for comb and extracted honey, have been continued. Two hives of each of the following sorts were used, one being arranged for section honey the other for extracted honey, the Langstroth, the Hedden and two other kinds more or less used in Canada, one measuring 15 x 15 x 12 inches, the other 15 x 20 x 15 inches. Eight colonies of bees were selected all of about the same strength and having good laying queens. The results from the four kinds of hives are shown in the following table. The hives are tabulated in the order of the returns they gave.

Hive.	Season.	Swarms.	Section Honey.	Extracted Honey.
			Sections.	Lbs.
Langstroth.....	1901.....	1	67	0
"	1902.....	1	0	79
"	1901.....	1	42	0
"	1902.....	1	0	48
15 x 15 x 12 inches....	1901.....	1	56	0
"	1902.....	1	0	63
"	1901.....	1	36	0
"	1902.....	1	0	42
Hedden.....	1901.....	0	54	0
"	1902.....	0	0	62
"	1901.....	1	38	0
"	1902.....	1	0	43½
15 x 20 x 15 inches....	1901.....	0	0	0
"	1902.....	0	0	23
"	1901.....	1	*16	..
"	1902.....	1	46½

* The 16 sections were only partly filled.

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EXPERIMENTS IN FEEDING SUGAR SYRUP FOR WINTER STORES.

These experiments begun during the autumn of 1900, with four colonies of bees, were continued in the autumn of 1901, with eight colonies, the extra four being the progeny of the first four. All the natural stores having been removed in September, a Miller feeder was placed in an empty section super, close to the top of the brood frames, any part of the brood frames not covered by the feeder being covered with a propolis quilt cut so as to allow the bees a passage through it. By keeping the feeder well packed around, except where the bees entered, the heat is kept in and at the same time the bees cannot daub themselves with the liquid. In these experiments the bees had a constant supply of syrup. The syrup was made of the best granulated sugar, two parts to one of water by weight. The water was first brought to a boil; then the boiler was set back on the stove, and the sugar having been poured in, the mixture was stirred until all was dissolved. The syrup was supplied to the bees at about blood heat. When the hives were put into winter quarters, the wooden covers were removed and replaced with a chaff cushion; the hives were also given extra ventilation at the bottom by placing at the entrance a wooden block between the brood chamber and the bottom board, raising the front of the brood chamber about 2 inches extra. In 1901, the eight colonies were put into winter quarter on November 9, their average weight being $57\frac{3}{4}$ pounds per colony; when taken out in the spring 1902 they averaged $46\frac{1}{4}$ pounds. All came out in excellent condition: there were very few dead bees about the entrance, and the bottom board was quite clean, there were no signs of dysentery.

The hives were set out on their summer stands March 22, the temperature at this date being 55° and the day, clear, bright and mild.

For the following ten days the weather was very fine and warm; the bees were flying well and built up rapidly; they were in excellent condition when the honey flow came on. The first pollen gathered was noticed on April 1; many bees were seen before this date gathering sap from maple tree stumps that had been freshly cut, also wherever a maple had been injured. During the summer each colony gave one swarm and made on an average $41\frac{1}{2}$ pounds of honey, this being considerably below the yield in 1901; but, considering the damp cool season, the results are quite satisfactory.

EXPERIMENTS WITH BROOD FOUNDATION OF DIFFERENT SIZES.

These experiments have been continued with the addition of full drawn combs.

- (1.) Full drawn combs;
- (2.) Full sheets of foundation;
- (3.) Half sheets of foundation;
- (4.) Starters or strips of about one inch.

For this experiment four swarms caught on July 2 were used, weighing $5\frac{3}{4}$ pounds each. Each hive contained only one of the above size of foundation in the brood chamber, but full sheets of foundation in the super. Each hive was weighed daily during the season to ascertain the gain or loss; notes were also taken on the way the bees built up in the brood chamber.

The results are very similar to those of 1901. The hive with strips of foundation (4) gave the largest return. In this instance the bees started to work not in the frames but in the sections in the super, which had full sheets of foundation, sooner than the bees in the hives Nos. 1, 2, and 3. Queen excluders were put on to prevent the queen going up into the supers. In the hive that had half sheets (3) and in the one with full sheets (2) the bees appeared to work about evenly in the brood chamber and in the super. In the hive that had full drawn combs (1) the queen began to lay eggs at once and the bees filled up the brood chamber first, a notable fact was that in the hives that had half sheets (3), as well as in those that had starters in the brood chamber (4), the bees built worker comb as far down as the foundation went, and below that they built very unevenly; in many instances the frames could not be lifted out without the combs breaking down and some of these combs were more than half drone cells. Not being wired

they were too weak to stand the process of extracting, and they would be too weak to support heavy swarms or stand shipping. The results of these experiments show that it is better in all cases to use full sheets of foundation, both in the sections of the supers and in the frames of the brood chamber.

EXPERIMENTS TO TEST WHETHER BEES INJURE SOUND FRUIT.

During the summer of 1901 when there was no surplus honey to be gathered from plants outside, experiments were made with ripe fruit of four different kinds, peaches, pears, plums, and grapes, exposed in different places in or near the Experimental Farm apiary, where it was easily accessible to the bees.

This experiment has been repeated during the season of 1902, with the addition of strawberries and raspberries. All the fruit was placed in the same position as in 1901, viz: (a) in the hives, (b) on trees and (c) in a work shop adjoining the house apiary.

Peaches, pears, plums and grapes.—The fruit was exposed in three different conditions: (1.) Whole, without any treatment; (2.) Whole, after having been dipped in honey; (3.) Punctured in several places with the blade of a penknife.

Four colonies were selected for this experiment, all of about equal strength. Each of these colonies was in a hive upon which was placed a super divided in the middle by a partition. From two of the hives the honey had all been removed, in the two remaining hives five frames were left, each having considerable brood, with honey around it. In each one of the four hives, the whole specimens of fruit not dipped in honey were hung within three empty frames tied together as a rack; the whole specimens of fruit dipped in honey were placed in one compartment of the super and the punctured specimens were placed in the other.

A. The bees began to work at once both upon the dipped and the punctured fruit; the former was cleaned thoroughly of honey during the first night; upon the punctured fruit the bees clustered thickly, sucking the juice through the punctures as long as they could obtain any liquid.

At the end of six days all the fruit was carefully examined. The sound fruit was still uninjured in any way; the dipped fruit was in a like condition, quite sound; but every vestige of the honey had disappeared; the punctured fruit was badly mutilated and worthless; beneath each puncture was a cavity, and in many instances decay had set in.

The experiment was continued the following week; the undipped sound fruit was left in the brood chamber, the dipped fruit was given a new coating of honey and replaced in the super, and a fresh supply of punctured fruit was substituted for that which had been destroyed.

At the end of the second week both the undipped and the dipped specimens of fruit that were sound at the end of the first week, as well as the punctured specimens, were considerably decayed and, where there were any openings in the skin, showed signs of having been worked on, though to no very great extent.

For the third week fresh samples of fruit of all the above kinds were used; the result was very similar to that of the first week and, as it was later in the season, some of the fruit that had been put in sound had begun to decay.

After the third week the bees in the two hives which had been deprived of all their honey, appeared to be very sluggish, and there were many dead bees about the hives, the weather being cool and damp was very much against these colonies. They had lived for the first three weeks on the punctured fruit and on the honey of the fruit which had been dipped, as there were at that season few plants in flower from which they could gather nectar; these bees had therefore died of starvation, notwithstanding the proximity of the ripe juicy fruit. This supply of food which they were urgently in need of, was only separated from them by the thin skin of the fruit, which, however, this evidence seems to prove they could not puncture, as they did not do so.

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The mean weight of each of these two hives on September 5, when the experiment began, was $24\frac{1}{4}$ pounds; at the end of the experiment four weeks later, each had lost $3\frac{1}{4}$ pounds. The mean weight of the two hives in each of which five frames with brood and honey had been left, was at the beginning of the experiment $36\frac{3}{4}$ pounds; the mean loss for each of these hives was at the end $1\frac{3}{4}$ pounds.

B.—Fruit exposed in the open air, hung from the branches of a tree in the apiary inclosure. In this experiment three sets of whole fruit were used, one being dipped in honey, one left undipped and whole, and the third punctured as before. The bees worked on the dipped and the punctured fruit, but were not seen to work on the undipped fruit, which remained perfectly whole.

C.—Fruit exposed on shelves in a work shop adjoining the honey house. This fruit as in the preceding experiments, consisted of whole undipped fruit, of dipped fruit, and of punctured fruit. The bees worked both on the dipped and the punctured fruit; only an occasional bee was noticed vainly looking for an opening on the whole undipped fruit.

Strawberries.—On July 2, 1902, ripe fruit of four sorts of strawberries, the Williams, Clyde, Bubach and Warfield, was exposed in the same positions as the other fruit, where it was easily accessible to the bees:—

(a.) Inside the bee hive;

(b.) On branches of trees in the apiary inclosure.

(c.) On shelves in a workshop to which bees had access through an open window. Every care was taken that all the fruit used in this experiment should be perfectly sound.

(A.) Fruit exposed inside bee hives.

The fruit was exposed in three different conditions (1) whole fruit without any treatment, (2) whole fruit that had been dipped in honey, (3) fruit of which each berry was cut in two.

Four colonies were selected for this experiment, all of about equal strength.

Each of these colonies was in a hive upon which was placed a super divided in the middle by a partition. In each one of the four hives, the whole specimens of fruit not dipped in honey were placed within three empty frames tied together as a rack in the brood chamber; the whole specimens of fruit dipped in honey were placed in one compartment of the super, and the berries cut in two were placed in the other.

The bees began to work at once upon the dipped fruit in the hive and kept continually on it as long as any honey could be obtained; they also clustered thickly on the whole berries and those cut in two, but did not appear to be getting or even trying to secure any substance from them.

(B, C.) The fruit exposed on the branches of trees and on the shelves in a workshop was not visited at all by the bees but decayed and dried up. In the hives all fruit decayed more quickly from the extra heat from the bees. This experiment lasted one week.

Raspberries.—Four varieties were used, the Red, Purple, very light coloured and Black Cap. On July 29, some berries of each sort were placed in the hives in exactly the same positions as the strawberries. At this date there was considerable honey coming in, and the bees did not touch any of the raspberries.

DIVISION OF BOTANY

FODDER CROPS.

Fodder crops of all kinds, with the exception of corn, produced heavily during the summer of 1902. The excellent condition of summer pastures and the general freedom throughout Ontario from insect pests, allowed stock to keep in the best condition without trouble. Aftermaths were heavy, and there was some difficulty in saving them. A subject which is always of extreme interest to farmers, particularly in those districts where there are apt to be summer droughts, is the best mixture of grasses and clovers to sow for permanent pastures. A great many experiments have been tried during the last fifteen years with all the different kinds of well known grasses in the market. As a result of all this work one special mixture has been found which, upon a medium soil both as to fertility and moisture, has produced regularly year after year heavy crops of the very first quality of hay or feed. The grasses and clovers which have been included in this mixture will succeed well in all parts of the Dominion, and those farmers and dairymen who have tried this mixture are so well pleased with the results they have obtained, that I again bring it to the notice of stockmen believing that they will find it a very satisfactory mixture to grow for two years' cutting and for two or three years' pasture. This mixture has been known as the Central Experimental Farm Mixture and consists of

Timothy	6 lbs.
Meadow Fescue	4 "
Orchard Grass	2 "
Kentucky Blue Grass	1 "
Red Top	1 "

CLOVERS.

Alsike	2 lbs.
Alfalfa	2 "
Mammoth Red	1 "
Common Red	1 "
White Dutch	2 "

22 lbs. of seed.

Average cost of seed per acre, \$2.50.

This mixture was sown at the same time as several others mentioned below in the spring of 1901 and was mowed once during that summer to destroy the weeds. The soil for all of these mixtures, which were sown upon plots of $\frac{1}{40}$ of an acre each, was tolerably even both as to fertility and moisture. Manure had not been applied for three years. The soil may be described as a rich sandy loam, but would be improved by under draining. The plots were visited by a large number of farmers during the summer, and it is gratifying to know that many of the large dairymen in the Ottawa district have sown fields with some of the mixtures and expressed themselves as extremely well satisfied with the results they have obtained. The following table gives the crops of the different mixtures for 1901 and 1902. These are not exactly in accordance with the records

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of former years as to the amount of crop produced, some being heavier this year for some reason, while others have dropped behind their average. This is particularly the case with the C. E. F. mixture (1), which this year was considerably lower than crops which have been reaped in previous years. This shortage was in the second crop. In three records of previous trials the second crop of the second year has almost equalled the July cut, while in 1902 it was over a ton less in amount. It must be borne in mind that, in compounding these mixtures, the chief object considered was their value for pastures for two (or three) years after being cut for hay for one year (or two).

Number.	Mixtures sown May 4, 1901.				Thoroughly cured Hay per acre.		
					1901.	1902.	
	Grasses.	Lbs.	Clovers.	Lbs.	September 24.	July 10.	August 30.
					Tons. Lbs.	Tons. Lbs.	Tons. Lbs.
1	Timothy.....	6	Alfalfa.....	2			
	Meadow Fescue.....	4	Alsike.....	2			
	Orchard Grass.....	2	Mammoth Red.....	1			
	Kentucky Blue.....	1	Common Red.....	1			
	Red Top.....	1	White Dutch.....	2	1 280	2 1,080	1 960
2	Meadow Fescue.....	6	Alfalfa.....	4			
	Timothy.....	3	Alsike.....	1			
	Canadian Blue.....	2	White Dutch.....	1			
	Orchard Grass.....	3			1 200	2 900	1 1,760
	Red Top.....	3					
3	Timothy.....	5	Alfalfa.....	6			
	Awnless Brome.....	4	Alsike.....	3			
	Orchard Grass.....	2			1 900	2 1,560	2 600
4	Meadow Fescue.....	6	Common Red.....	4			
	Orchard Grass.....	2	Alfalfa.....	3			
	Kentucky Blue.....	1	White Dutch.....	1	1 1,080	2 1,200	3 320
5	Timothy.....	6	Alfalfa.....	6			
	Upright Brome.....	4	Mammoth Red.....	4	1 920	2 1,120	1 1,840
6	Timothy.....	10	Common Red.....	6	1,560	2 1,040	1 1,720
7	Timothy.....	10	Mammoth Red.....	6	1,200	2 440	1 760
8	Orchard Grass.....	18	Alsike.....	5	1 120	1 1,320	1,680
9	Orchard Grass.....	18	Common Red.....	8	1 400	2 80	1 1,200
10	Meadow Fescue.....	20	Common Red.....	8	1 40	2 400	1,640
11	Timothy.....	12	Mammoth Red.....	8	1,920	2 880	1 880

Number.	Mixtures sown May 4, 1901.		Thoroughly cured Hay per acre.			
			1901.		1902.	
	Grasses.	Lbs.	Clovers.	Lbs.	September 24.	July 10. August 30.
					Tons. Lbs.	Tons. Lbs. Tons. Lbs.
12	Timothy.....	12	Common Red.....	8	1 280	2 1,360 1 760
13	Timothy.....	5	Common Red.....	5	1 680	2 1,120 1 1,280
	Awnless Brome.....	10	Mammoth Red	5		
14	Awnless Brome.	25	.....		1 400	2 1,220 1,800
15	Awnless Brome.	15	Common Red.	8	1 720	2 1,280 1 1,480
16	Timothy.....	8	Mammoth Red.....	8	1 680	2 1,220 1 1,120
17	Alfalfa.....	15	(weight green, 8 tons 720 lbs)		1 1,680	2 80 1 1,080
18	Bokhara Clover.....	15	(weight grn., 12 tons 400 lbs)		2 600	2 1,560 No cut; a bi-ennial.

Of the different grasses used, the Awnless Brome Grass has been frequently treated of in also for its adaptability to almost all kinds of soil, whether they be moist as in the these reports and is a grass of extreme value, as a producer of both hay and pasture, and intervale lands of New Brunswick and the low meadows of New Ontario, or lacking in moisture as on the dry plains of the North-west, or the semi-arid hills of British Columbia.

The Meadow Fescue (*Festuca pratensis*, L.), is a rich succulent hardy grass which roots deeply and produces two heavy crops of excellent hay. The abundant growth of young foliage, which is very tender, makes this a valuable addition to pasture mixtures.

Orchard Grass (*Dactylis glomerata*, L.).—This grass is perhaps the quickest grower after cutting, of any grass we have tried at Ottawa. The foliage when young is particularly tender and palatable to stock, but when it is allowed to get old, it becomes tough and dry. It is a heavy producer, but the hay is rather light. It requires a deep soil and heavy feeding. When cut for hay, it must be cut early. At Ottawa it is generally ready for mowing by June 20, the same time as the Meadow Fescue. For this reason, these two grasses are well suited for mixing with the Common Red or June Clover, because they mature at the same season.

Kentucky Blue Grass (*Poa pratensis*, L.).—This is the Smooth Meadow Grass of England, the June Grass of the greater part of Canada and is one of the grasses which is frequently spoken of as ‘spear grass’ in some parts of the Dominion. It is a grass of extreme value, succeeding best in cool damp districts, but thriving well and increasing rapidly in all temperate climates of the world. It is by far the best lawn grass known, wherever there is sufficient summer rain to allow growth to continue, being of an intense green colour at all seasons of the year and quickly forming a thick sod. As a factor in

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permanent pasture mixtures, it has no superior and never should be omitted. It produces, when closely fed, probably more actual food for stock than any other grass, and its season lasts except in very dry localities from early in the spring until hard frost. It is essentially a pasture grass, and produces but very little hay.

Canada Blue Grass (*Poa compressa*, L.).—This grass is also known as 'Wire Grass' and 'Flat-stemmed Meadow Grass.' It produces a rather small crop of exceedingly heavy rich hay. When fed down, it reproduces itself rapidly and is almost as valuable as Kentucky Blue Grass. The seed of this grass is largely sold as lawn grass, but it is not nearly so well suited for this purpose as Kentucky Blue Grass, on account of a reddish tinge which it takes on when touched with frost or when affected by drought. It has not the same habit as Kentucky Blue Grass of spreading extensively by underground root shoots or stolons, and therefore does not form so rapidly a thick sod.

Red Top (*Agrostis vulgaris*, Withg.).—This grass produces in damp soil a very large quantity of fine but not very rich hay. It is of special value in wet land, where it will stand more water than any other of the cultivated grasses. It is palatable to stock and should always be used in grass mixtures for low lands. It seeds freely and spreads rapidly.

Timothy (*Phleum pratense*, L.).—This grass is too well known by Canadian farmers to require any special mention. When mixed with clover for hay, the Mammoth Red or late clover should be used, as these two plants come to maturity at the same time, while the Common Red Clover is about a week earlier than Timothy.

SIMPSON'S TRUE-PERENNIAL RED CLOVER.

(See Plate.)

In the spring of 1897, I received from Mr. Walter Simpson, of Bay View, Prince Edward Island, some roots of a very interesting clover which he had found growing spontaneously on his farm. This clover has now been cultivated here in the experimental grass plots for six years, and has shown that it possesses many valuable agricultural characteristics. It is a long-lived perennial which spreads by copious underground stolons. Although not producing so much fodder as the Common and Mammoth Red Clovers—it has given as much as one and a-half tons of hay to the acre—it is much more persistent. Owing to its stoloniferous root system, it does not suffer, as those well known varieties do, from heaving and winter-killing. A plot of this clover one square rod in extent, was planted on April 23, 1901, by setting out root shoots in rows one foot apart, with the plants six inches apart in the rows. By June 7, there was a growth of three inches, and by July 26 the bed had an average height of four inches, many of the plants being in flower. This plot was not cut at mid-summer, and the seed was ripe by September 21. On July 3, 1902, the bed was a heavy mat of thick clover twelve inches high, with fine leaves and many large purple flowers, as shown in the plate herewith. The whole plot was saved for seed, which was ripe by the first week in October. Unfortunately, this clover has shown under cultivation the serious defect of maturing very little seed. It has, however, never been treated as the ordinary Red or Mammoth Clovers are when grown for seed, by being cut for hay in midsummer and the seed collected from the second crop. Under similar circumstances, the varieties above named also show this defect to some extent, as is mentioned by Professor W. J. Beal, in his 'Grasses of North America.' Next year the first crop will be cut as soon as the plants are well in flower, and the seed will be saved from the second crop. If it still shows the same partial sterility, an effort will be made to produce an improved form by hybridizing it with Common Red, Mammoth and other clovers.

I am unable to come to a decision upon the exact botanical status of this clover. It does not answer in all respects with any known and described species of clover, but

may probably be an aberrant form of *Trifolium medium*, L., or a hybrid of that species with some other clover. *Trifolium medium*, as described in European works, does not correspond with any clover known to such botanists as I have been able to consult, or that I myself have ever seen growing in Canada.

Mammoth Red Clover, which is the same as Cow Grass of English seedmen, is stated in most American works to be *T. medium*, L., but it lacks entirely the stoloniferous or true-perennial habit of Simpson's perennial clover. In Sutton's 'Farmers' Year Book,' Cow Grass is stated to be a hybrid between *T. medium*, L., and the Common Red Clover (*T. pratense*, L.), but Simpson's True-perennial Clover does not agree either with the description of Cow Grass, nor do plants grown from seeds received from Sutton & Sons under that name, in any way resemble the Prince Edward Island plant. *T. medium* is called Zigzag Clover, from the angulated growth of the stems, but I find no approach to this in our Canadian plant. Simpson's True-perennial Clover is a free-growing, frequently branching, narrow-leaved, rather smooth perennial clover, much resembling the figure of *T. medium*, given in Sowerby's 'English Botany,' but with, as a rule, two large cylindrical-ovate heads of flowers, on pedicels from one to two inches in length, terminating each branch of the stem. The plants have no true caudex but throw out freely in all directions through the soil vigorous stolons, by which the plants spread rapidly. The seeds are heart-shaped, pale yellow in colour, smaller than those of both Common Red and Mammoth Clovers. From the fact that so little seed is produced, the hybrid nature of this clover is suggested, and it is probable that *Trifolium medium* may have been a parent. If Mammoth Red really be a hybrid, it is possible that this form may have originated from seed sown as that variety, and, as all hybrids are for a time unstable and subject to variation in different directions, the plant under discussion may be a hybrid which has run back towards *T. medium*, much more than is usually the case.

Mammoth Red Clover is now extensively grown and is fairly constant in its characters. It may be described as merely a large free-growing variety of the Common Red Clover with larger and handsomer seeds, maturing about a week later in summer, but with exactly the same kind of rootstocks; in fact, it bears about the same relation to Common Red Clover, that Tall Fescue among the true grasses does to the slightly smaller Meadow Fescue. Common Red Clover is normally a biennial, with a tap-shaped rootstock. The plants, as a rule, die after ripening seeds the second year, although, if cut twice so as to prevent seed ripening, some plants will grow the third year. Mammoth Red Clover is slightly more persistent, but with a rootstock of the same nature; and I have never been able to find a plant which produced stolons or running rootstocks.

THE ORIGIN.

All that is known of the origin of this clover is given in the following extract from a letter of Mr. Walter Simpson, the discoverer:—

Bay View, P.E.I., Nov. 20, 1902.—'It was about ten years ago that I found this clover growing along the edge of a spruce bush on my farm here in Bay View. It was just outside the cultivated fields and under the boughs of the spruce at the south side of the bush, about four chains from my buildings. My attention was attracted to it in passing, by the peculiar shape of the leaves. The clover when first found was in a thick mat extending about two rods in length and a yard in width. It looked very pretty growing, on account of its pointed leaves and rich dark green colour. I thought at first sight that it was something new and showed it to several neighbours, but they failed to see its difference from other clovers. It was first pronounced to be *Trifolium medium*, by the expert botanists of the Prince Edward Island Natural History Society, and was catalogued as such in their lists of new plants found on the island.

'The original patch still exists and has spread considerably from where first found and it has crept out into the cultivated field. I had none of it ripen this year, as the sheep had access to it all summer and cropped it close. In years that it did ripen, I could not find a single seed in the heads, though, of course, I did not examine it very closely. I have never given it any cultivation.'—WALTER SIMPSON.

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No descriptions of *T. medium*, L., which I have been able to find in European and American botanical works, answer to the Prince Edward Island plant; but, should the latter prove to be a form of that species, it indicates that *T. medium* is a valuable clover which merits far more general recognition and trial by American agriculturists than it has so far received.

Simpson's True-perennial Red Clover is particularly well suited for including in permanent pasture mixtures, both from its low stocky growth and for its truly perennial habit, which gives it a great advantage over either Common Red, Mammoth or Alsike clovers. As compared with White Dutch Clover, it is equally hardy and is a much heavier cropper.

REPORT OF THE POULTRY MANAGER.

(A. G. GILBERT.)

TO DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

OTTAWA, December 1, 1902.

SIR,—I have the pleasure of herewith submitting to you the fifteenth annual report of the Poultry Department.

Perhaps in no previous year has more extended inquiry been made by farmers and others, more or less interested, into the best methods of profitable poultry keeping with the object of producing eggs in winter and early chickens for export or home market, than in the past one. With the hope of aiding, more particularly on this occasion, in the production of the early chickens which bring the highest price, the subject is discussed in all its various phases. Such information is given and deductions made as experience has shown are likely to be conducive to the best and quickest results.

The best types of early chickens and how they may generally be produced are discussed from various standpoints. The objectionable features in many early birds are pointed out and a remedy suggested for the same.

Experimental fattening of chickens of different breeds in crates and with limited run and on various rations, furnishes important and interesting data. Some results showing the length of time in which the best gains are made and the time at which progress ceased cannot fail to be of value to those interested.

Details of the work of the year are given in such shape as calculated to be most useful.

During the year a number of addresses were delivered in many parts of the Dominion on subjects akin to my department.

The annual Christmas Poultry Fair at Renfrew, Ont., on December 2, was remarkable for the great improvement in the quality of and the manner in which the birds were dressed. The same may be said of the dressed poultry display at the Fat Stock Show held in Guelph, Ont., from December 8 to 12. It is evident, from the improved appearance of the dressed poultry exhibited on both occasions, that farmers are fast realizing the importance of having their exhibits present an inviting appearance and the enhanced value accruing thereby.

I have pleasure in mentioning the faithful services of Mr. George Deavey, who assists in the care and management of the poultry under my charge.

The demand for information on all lines of poultry keeping continues with unabated interest from increasing and varied sources, and which may fairly be taken as an instance of the rapid development of the poultry branch of farm work.

I have the honour to be, sir,

Your obedient servant,

A. G. GILBERT.

THE WORK OF THE PAST YEAR, 1902.

The increasing demand for the early chicken, which is desirable, because it brings the highest price, has directed attention and inquiry as to how it can best be produced.

In this connection the experimental work of the past and two preceding years has been productive of results, which it is hoped will prove useful to the farmers of our country from whom inevitably must come the greater quantity of poultry and eggs, so much in demand.

Experience, so far gained, has shown with no uncertain sound that in order to have the healthy and quick growing early chickens, in paying quantity, it is imperative to have:—

1. Parent stock in robust condition.
2. Strong germs usually the result of No. 1.

How can these conditions so essential to success be generally secured?

Close and careful observation has led to the conclusion, that the conditions named can best be attained when the winter house is so constructed, as to permit of the laying stock having greater access to, and opportunity for exercise in fresh air than the majority of winter houses at present permit.

It is particularly desirable then that the hens which are layers during winter, and which are likely to be the breeding stock of spring should be allowed run during winter to barn or shed, and so obtain the desired change of air. Happily, the majority of farmers are so situated as to make this a matter of little difficulty. It is, however, still held by certain parties that no matter how favourable the conditions may be, that eggs laid in spring by hens which have been prolific winter layers are not likely to contain strong germs. Such contention has not been borne out by the observation made and results noted during the recent winter, and which are given in a following page. On the contrary these results show that where the fowls have had fresh air and exercise, although winter layers above the ordinary, the germs of their spring eggs were much stronger than those of hens which had been confined, in a comparatively warm atmosphere, from beginning to end of winter. The importance of using every effort to secure strong germs in early spring eggs and so preventing the number of 'dead chicks' in the shell near maturity cannot be too strongly emphasized.

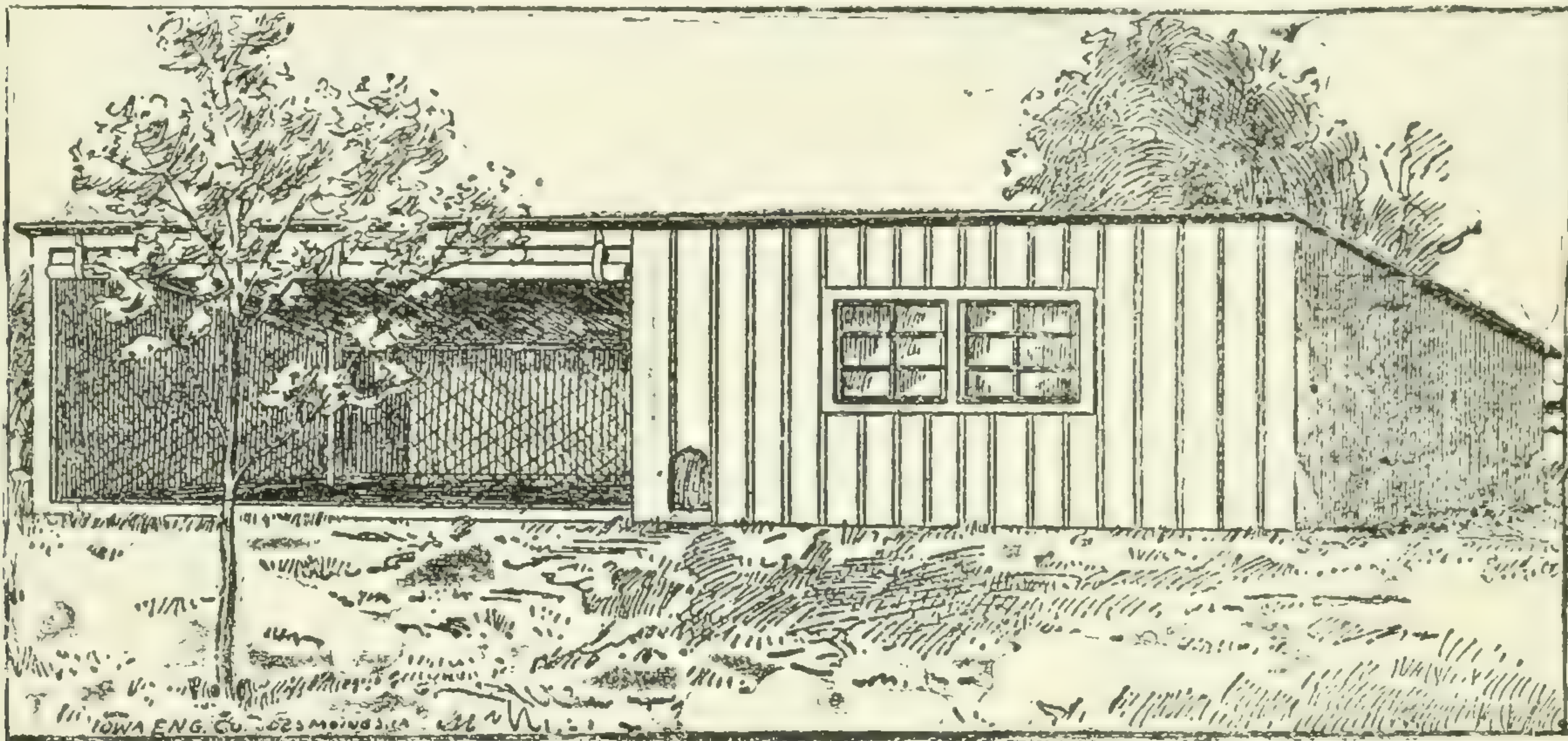
RECURRENCE TO THE SUBJECT.

It may be said that recurrence to weak germs and 'chicks dead in the shell' is to repeat an old story. But it is one nevertheless of the greatest moment, as the numerous letters received on the subject prove. Its importance demands careful and patient investigation, for it is palpable that unless a paying percentage of chickens are hatched and reared there will be all work and no profit. Without a margin of profit, early chicken raising would surely be abandoned. It is of vital consequence to the success of this enterprise, which offers such a wide field of emolument, that its prosecution should be made as easy and certain as possible. It is, therefore, desirable to consider the best means to this end.

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THE OPEN SHED ATTACHMENT TO POULTRY HOUSE.

One way of securing fresh air and exercise during winter is the open shed attachment to the poultry house, a plan of which, is shown below. This arrangement has been adopted and successfully operated by numerous farmers. The following shows a single house and shed owned by Mr. J. S. Jeffreys of St. Catharines, who writes a description of the premises as follows :—



A cheap and convenient Poultry House with Scratching Shed. Property J. S. Jeffreys, St. Catharines.

ST. CATHARINES, November 10, 1902.

‘The house referred to is 12 x 60 divided into four pens, each having a roosting and laying house 7 x 12 and scratching shed 8 x 12. The roosting room is built of double boards and battens outside, then paper and matched sheeting on the inside. The sheeting and all studs are of hemlock, the outsides boards pine and sills of cedar set on cedar posts, 6 feet apart.

‘The hemlock sheeting was used for two reasons. First, because it was cheaper than pine and second rats do not go through it as much as they do pine.

‘There are no floors, but the earth on the bottom of the pens is raised three feet higher than the ground outside.’

THE BEST TIME FOR AND MEANS OF HATCHING THE CHICKENS.

The strong germs being secured in the manner as outlined, it is now in order to consider the best time and means of hatching and rearing the chickens so as to have the most satisfactory results. These will to a great extent be governed by the exigencies of locality and facility. In some cases it may be quite possible to begin operations earlier than in others, and such effort will doubtless be rewarded with a higher price, for the earlier the chicken the better the price. To such persons the open scratching shed poultry house will be invaluable. But it was pointed out in report of this department for 1900 that the most suitable time for the great majority of farmers to hatch out their chickens is in April, or, early May, for the reason that unless provided with incubator room and brooding house, so as to be independent of outside temperatures, it would be inconvenient, if not impossible to raise chickens in paying numbers at an earlier season. Further experience and expressions of opinions from farmers strengthen that statement. Experience has also shown that pullets hatched prior to late April, or, May, although they may begin to lay in late summer or early fall, are apt to moult and

remain non-productive when eggs are at their highest value. On the other hand the May pullet, which probably begins to lay in November and continues to do so without ceasing during the season of high prices is obviously the most suitable bird for the farmer.

As to the best means of hatching and rearing the chickens, farmers and poultry breeders are fast realising that in order to have the early chickens in requisite number and uniform age artificial means are necessary. There is no intent to belittle the hen as a hatching medium. Doubtless she will be the favourite with those who desire only a limited number of chickens and are not particular as to whether early or late hatched. But where over one hundred chickens are desired early and at the same time, many more hens than are usually obtainable at that season would be required to give desired results.

HOW MANY CHICKS SHOULD A FARMER REAR?

In connection with the early hatching and rearing of chicks the question is frequently asked as to the number of hens a farmer should keep and the number of chickens he should hatch. This question has been answered in a previous report, but it is asked so frequently that it may be admissible to reply to it again. Under ordinary conditions a farmer should be able to keep from 50 to 100 hens and to raise with success 150 chickens. If there is help to be had from wife, sons or daughters a greater number may be successfully handled. But it is fair to presume that the greater number of chickens throughout the country will be produced by the farmers with a few hens rather than by few farmers with a great number. As in other lines of business it is not wise to aim at large results in poultry keeping without the assistance necessary to ensure success.

A SENTIMENTAL VIEW OF HELP FROM THE FARM HOME.

Poultry keeping admittedly affords congenial and healthful employment for women. Many poultry plants, of less or more magnitude, are successfully conducted in this and the neighbouring country by wives or daughters of farmers and business men. In England several extensive poultry establishments are successfully managed by ladies of title and wealth. A phase of the subject which, perhaps, appeals to the farmer from a sentimental as well as practical standpoint is that in creating a taste for poultry culture in his boys or girls he may weave a tie that will permanently bind the young people to the farm. The caring for and properly feeding of 150 or 200 chickens certainly afford ample opportunity to the young or older people, for in no time of the chicken's life is proper care and feeding more required than during the first six weeks of its existence. And in too many instances that, unfortunately, is the period during which chicks are allowed to 'pick up their own living.' It is hardly necessary to say when chickens so cared for arrive at the market they receive the lowest value. It is well to bear in mind that any extra care or attention given to the chick during the period mentioned will be amply repaid by quick development. On the other hand neglect can hardly ever be repaired.

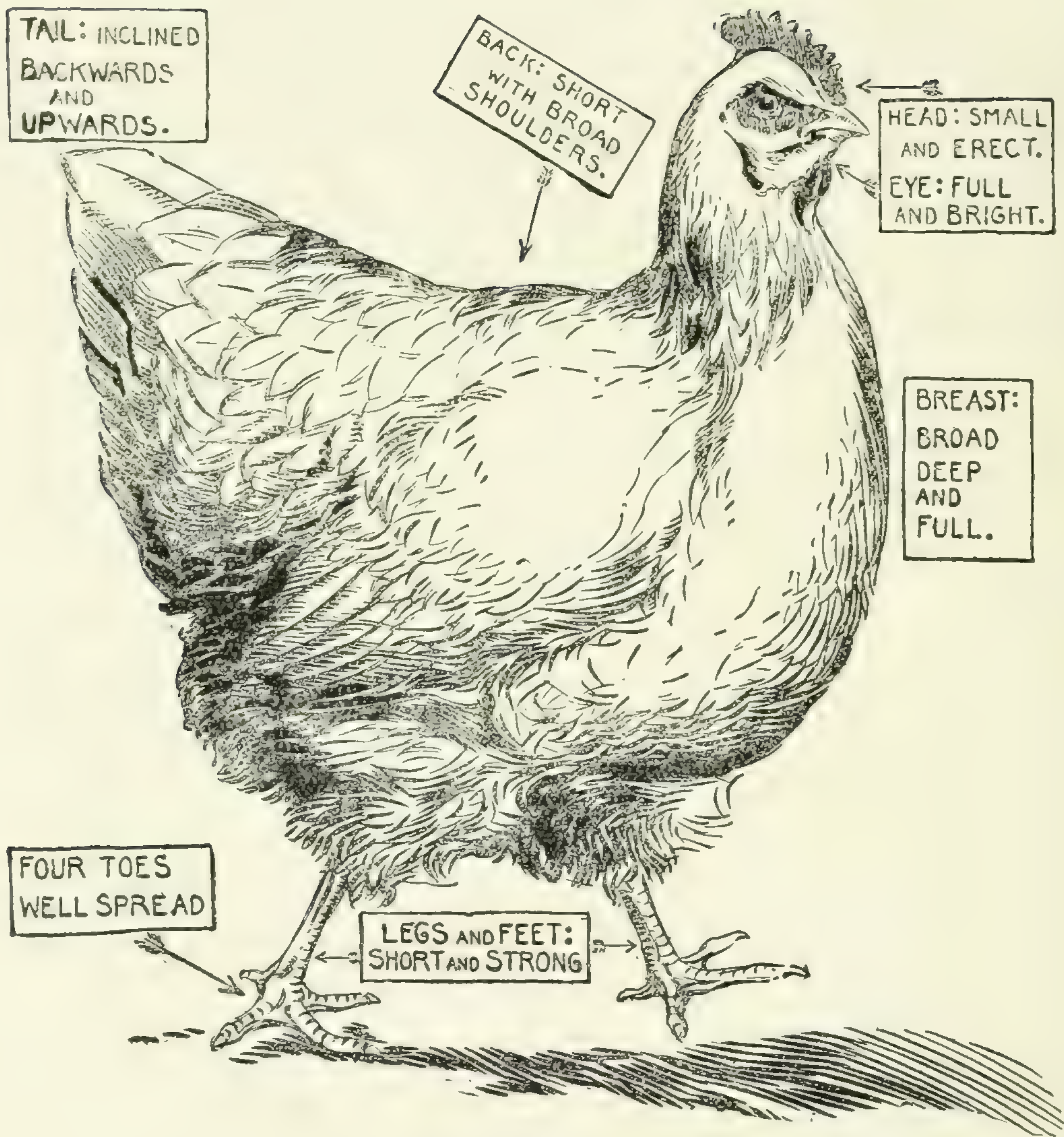
CLOSE CONFINEMENT *vs* FRESH AIR.

In order to ascertain results in strength of germs, and number and vitality of chicks from hens which were closely confined, in a warm house during winter as compared with those which had run in cold but fresh air, the following tests were made. On March 11 two broody hens were given 13 Barred Plymouth Rock eggs each. These eggs were from hens which had laid fairly well during the winter, were mated with a vigorous

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young bird, but had been confined to pens from beginning of season, without any opportunity for outside run. The eggs were as nearly new laid, as possible. Results from the 26 eggs were 9 chickens which were placed in an outside coop and made satisfactory progress for a few days, but despite attention and careful feeding dropped off, one at a time, until only two were left, and they made most unsatisfactory progress, and never attained full size. They were all evidently weaklings, the offspring of weak germs.

A week later 13 eggs were obtained from Barred Plymouth Rock hens which had laid well during the winter, but had a run out to a small shed which they were often into, even in very cold weather. The hens were mated to a vigorous young male, which also had the benefit of the run. The result was 7 chickens, which with the mother hen as with the first lot were placed outside in a slatted coop. The chicks were hardy from the first. With the same food and treatment as given to the others, they made rapid growth, without any loss in their number. They gave every evidence of constitutional vitality. Further details as to the condition of the unhatched eggs, in both cases, will be found in the following table of eggs set and chickens hatched (by hens) during the season. This table also furnishes further instances of the effect of close confinement on hatching results, as compared with those after the fowls had opportunity to run outside. It will be seen that in all cases the eggs were placed under hens. In the case of the early eggs this is worthy of notice, for failure cannot possibly be attributed to the hatching medium, as might be done had artificial means in the shape of incubator and brooder been used. Poor results then point clearly to the eggs as the cause.



TYPICAL BUFF ORPINGTON PULLET.

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	13	"	"	(2).....	"	"	10.....	2	
"	19....	13	"	"	"	"	"	2	This pen simply went to pieces. Remaining 11 eggs contained germs which had just started.
"	26....	13	Black Minorca eggs.....	"	Hens.....	"	17.....	11	1 egg with dead chick in it. 1 egg addled.
"	28....	11	Buff Orpington—3 Faverolle eggs.....	"	Pullets.....	"	19.....	11	3 clear eggs.
"	28....	13	White Leghorn eggs.....	"	"	"	19.....	5	3 eggs containing chicks crushed in nest. 5 eggs with germs which had apparently just made a start.
"	28....	15	Faverolle eggs.....	"	"	"	19....	4	1 egg containing chick crushed in nest. Male bird had evidently been ill for sometime previous to setting the eggs.
"	28....	13	Rhode Island Red eggs.....	"	"	"	19.....	11	1 chick dead in shell. 1 egg addled.
"	28....	13	Barred Plymouth Rock eggs.....	"	Hens.....	"	19....	5	Eggs came by Express from Quebec. Evidently injured in transit as 8 eggs were addled.
May	3....	13	"	"	"	"	24.....	8	3 chicks dead in shell. 1 clear egg. 1 chicken crushed in nest.
"	3....	8	White Plymouth Rock—4 White Leghorn eggs.....	"	"	"	24....	9	3 chicks dead in shell fully developed. 1 clear egg.
"	10....	8	Buff Orpington—4 White Leghorn eggs.....	"	Pullets.....	"	30.....	7	Remaining eggs addled.
"	10....	13	White Wyandotte eggs.....	"	Hens.....	"	30.....	6	" contained germs more or less developed.
"	10....	13	Buff Rocks eggs.....	"	Pullets.....	"	30.....	7	" "
"	10....	13	Light Brahma—Buff Plymouth Rock cross eggs.....	"	"	"	30.....	7	" "
"	22....	11	White Leghorn—2 White Plymouth Rock eggs.....	"	"	June	12.....	7	" "
"	22....	12	Buff Orpington—1 Barred Plymouth Rock eggs.....	"	"	"	12.....	11	Two eggs did not hatch.
"	23....	13	Barred Plymouth Rock eggs (1).....	"	"	"	13.....	10	1 chick crushed in nest. Remaining eggs did not hatch.
"	23....	13	" (2).....	"	"	"	13.....	5	5 clear eggs. 3 unhatched eggs contained partially developed germs.
June	7....	12	White Leghorn—1 Buff Orpington eggs.....	"	"	"	28....	11	2 eggs gave no results.
"	22....	13	Black Minorca eggs.....	"	Hens.....	July	13....	12	1 "
"	28....	13	Buff Orpington eggs.....	"	Pullets.....	"	19.....	8	Chicks hatched too late. Did not do well.
"	28....	13	White Leghorn eggs.....	"	"	"	19.....	9	" "
								281	
								518	

From the hatching results shown in above table some interesting deductions may be made, viz.:—

1. The chicks from the eggs of hens which had voluntary run during winter, proved strong and lived, while the chicks from the closely confined died, with the exception of two, which did not make satisfactory growth.

2. That germs evidently became strong at twelve or fifteen days after the hens had a run outside. This will answer a question often asked 'as to when the eggs of hens closely confined become strong?'

3. Proof of the statement made in a previous page that 'farmers have exceptional opportunities to allow their fowls a run in barn or shed during winter and so secure the strong germ,' is found in the results from the eggs obtained from a farmer at Myrtle, Ont. The eggs, 44 in number, were likely laid in late March or early April. They had come by express and over a rough road to the farm, and on reception showed every evidence of being knocked about in transit. Such was their apparent condition that few or no results were anticipated, but 24 strong chickens were hatched and made rapid growth, sure indications of robust parent stock.

4. The 15 Barred Plymouth Rock pullets in No. 2 group had two pens thrown into one, or double the space that No. 1 group of the same sort and number had. They were for the most part later hatched than those of No. 1, but all other conditions as to temperature and treatment were the same. They did not, however, lay as many eggs, nor did their eggs produce as many chickens as did those of No. 1 group. This shows that neither warmth nor rations compensated for comparatively immature development.

5. That the chickens hatched in July did not thrive well. This emphasizes the advice given in previous reports not to have chickens so late in the season if at all avoidable.

Results from eggs put into an incubator during early spring time were very similar to those obtained from eggs under hens at the same period. There was a large and discouraging number of chickens dead in the shell, at or about the pipping stage. This great mortality in fully developed chickens almost ready to leave the shell has been, and is the subject of much discussion in the poultry press of Great Britain, United States and Canada. While it is admitted that the healthy condition of the breeding stock in the spring is of paramount importance, the question is asked 'Has the incubator no responsibility in the matter?'. One of the best articles, among the many written on the subject, is by a correspondent who writes under the *nom de plume* of 'Medicus,' to an English scientific paper. His contention, strengthened by results of experiments conducted by himself, is that at all times during the period of incubation there was in the incubators tried by him a lack of oxygen, but particularly so at the critical hatching period. Doubtless the thorough ventilation of the subject will result in improvement. Already the incubators made by leading manufacturers are arranged to admit a greater amount of fresh air. This better ventilation of incubators in combination with improved methods of winter house accommodation and management of the laying stock, will no doubt, bring a more satisfactory percentage of strong early chicks. It is but fair to state that incubators are sometimes operated under the most unfavourable conditions, and satisfactory results can hardly be expected. On the other hand, where conditions are favourable, Mr. L. H. Baldwin, of Deer Park, near Toronto, by his skilful manipulation of breeding stock and machines, seldom fails to secure 80 per cent and frequently 100 per cent of returns. Investigation into and discussion of the subject, up to the present time, seem to warrant the call for 'fresh air and more of it for breeding stock and incubators.'

PROGRESS OF THE CHICKENS.

The treatment of the chickens after hatching by hens or incubators was much the same as described, at length, in reports of previous years. There was a difference, however, in the weather conditions of spring and early summer of the past year. The long continued wet and cold weather resulted in unusual mortality among the chickens of

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one, two and three weeks of age. The high death rate was not confined to this locality, as was shown by the number of letters received on the subject from many parts of the country, asking as to cause and a remedy. Beyond the unfavourable weather it was impossible to assign a reason for such general loss.

Effort was made to hatch a majority of chickens of the breeds calculated to be of the most use to farmers as winter layers and rapid flesh makers. Chickens of Buff Orpingtons, Faverolles, Buff Plymouth Rocks and Rhode Island Reds were hatched for the first time. All these varieties have claims to utility from the standpoints named. The development of the chickens of these comparatively new comers, as well as from a second cross from a first one of Light Brahma male and Barred Plymouth Rock female, was watched with much interest. The first cross of Brahma and Plymouth Rock proved an excellent one, from both egg laying and market points. The number of eggs laid by 15 pullets of this first cross in comparison with an equal number of White Plymouth Rock and White Wyandotte pullets during the winter season of 1901-02 is shown in a table of eggs laid by different breeds in six months, to be found on a later page. The chickens were taken from running in a field when weighed. In a later part of this report the results of experiments conducted by the Chemical division in the fleshing of chickens of different breeds, on various rations, and in crates or limited run are given, and furnish interesting and valuable data. The following are the weight developments of the chickens, up to three months of age and previous to being used for the Experimental work referred to viz :—

Barred P. Rock Cockerel at 3 mos.	.....	3 lbs. 10 ozs.
“ “ “	.....	4 “ 2 “
White Wyandotte “	.....	3 “ 11 “
“ “ “	.....	3 “ 2 “
Faverolle “	.....	3 “ 7 “
“ “ “	.....	3 “ 2 “
Silver Gray Dorking “	.....	3 “ 15 “
“ “ “	.....	3 “ 3 “
Buff Orpington “	.....	3 “ 12½ “
“ “ “	.....	3 “ 5 “
Rhode Island Red “	.....	3 “ 4 “
“ “ “	.....	2 “ 14 “
Light Bra.-B.P.R. (2nd cross) “	.....	4 “ 6 “
“ “ “	.....	4 “ 3 “
“ “ “	... ..	5 “ 1 “

Chickens obtained from a farmer near Carleton Place, Ont., for Experimental fattening weighed as follows :—

Barred Plymouth Rock Cockerels at 2 mos. and 6 days :—2 lbs. 5 ozs : 2, 4 : 2, 5 : 2, 2. These chickens were also taken from a field, but had been regularly fed and well cared for.

EARLY MARKET TYPES.

With the view of ascertaining which breed furnished the earliest and best market type careful attention was given to the chickens of the varieties and ages named above. Among them will be noticed two well known English and French table fowl producing breeds viz : Dorking and Faverolle. The ideal chicken borne in mind was one of rather blocky frame, showing a rounded breast with fairly long, low and straight breast bone well covered with flesh and thighs carrying a generous proportion of meat, with white flesh and legs of light colour. Such a chicken should present a plump and inviting appearance and make a model three months old bird for early home market, or export. Experience so far gained goes to show that none of the utility breeds of to-day furnishes three months old chickens of acceptable type, in greater number, on an average, than another. All varieties tried have produced early chickens of desirable shape and size, but in limited

number. It is a matter of congratulation that we have the desirable models furnished by several rather than by one variety, for it renders their production so much easier. How then may the desirable types be produced?

HOW THE BEST TYPES MAY BE PRODUCED.

This should not be a matter of difficulty. Selection of the best types of the different varieties and breeding from them only, will eventually bring the early chickens of shape, size, quality and in numbers wanted. Skilful and careful crossing of breeds, with the aim of producing layers and flesh formers combined, resulted in Plymouth Rocks, Wyandottes and Orpingtons, with their many subsequent varieties, which as utility fowls are hard to better. And what has been already so successfully achieved can surely be repeated in the production of the early chickens of acceptable type.

WHAT A PURCHASER FOR EXPORT SAYS.

It may possibly be remarked that much is being said about the three months old chicken for export, while our home market also calls for the early and superior quality which cannot be had in quantity nearly sufficient to fill the demand. Some differences in the two markets are noted in a subsequent page. The following letter from Dr. Boulton, manager of the Canadian Produce Company of Toronto, purchasers for export, on the most acceptable chicken for the English market will be read with interest. This gentleman who has spent some time in London, Eng., studying the different phases of that market, is well qualified to express an opinion. He writes as follows:--

CANADIAN PRODUCE CO.,
TORONTO, December 3, 1902.

DEAR SIR. . . . I am afraid that I have said all I can, and all I know about export chickens many times, but I might say again that the three-pound bird, which means the same thing as the three months old bird, is what is wanted. In fact we can sell a dozen chickens weighing from 30 to 40 lbs. per dozen, to one of all the other sizes, and the preference is given to small and young birds of large breeds, rather than to the same weight but mature birds of smaller breeds. The call is, more than ever however, for quality. Everything else may go and is really of very small importance in comparison with this point. However, I am glad to say that the improvement in the quality is marvellous. As regards methods of fattening special attention should be given to processes which improve the colour, and put on a fair amount of fat without robbing the breast of its lean meat. We receive many birds with every evidence of earnest endeavour to fatten, and every evidence of same as regards quantity of fat, but the birds are actually thinner than normal. I attribute this to carrying on the process too long. Careful experiments should be made to find the exact point from which the birds go back, and I think for the average farmer partial confinement, not in coops, and good feeding, the most practical method.—ALFRED BOULTBEE.

As to the time required to fatten, by crating the birds, frequent experiments have shown that three weeks should suffice to finish the bird, in the most acceptable form. In some cases it is quite possible to shorten the time by a few days. Much depends upon the breed of chickens, their age, and the condition they are in, when received from the farmer, or dealer. Experience has also shown that a crated chicken if not a hearty eater, will not likely be a rapid flesh maker. If the special feeding is carried on longer than three weeks, the bird is likely to remain stationary and if continued over a month is likely to lose weight, or, go back. This is shown in a marked manner in the results, given in following pages from the experimental fattening of chickens.

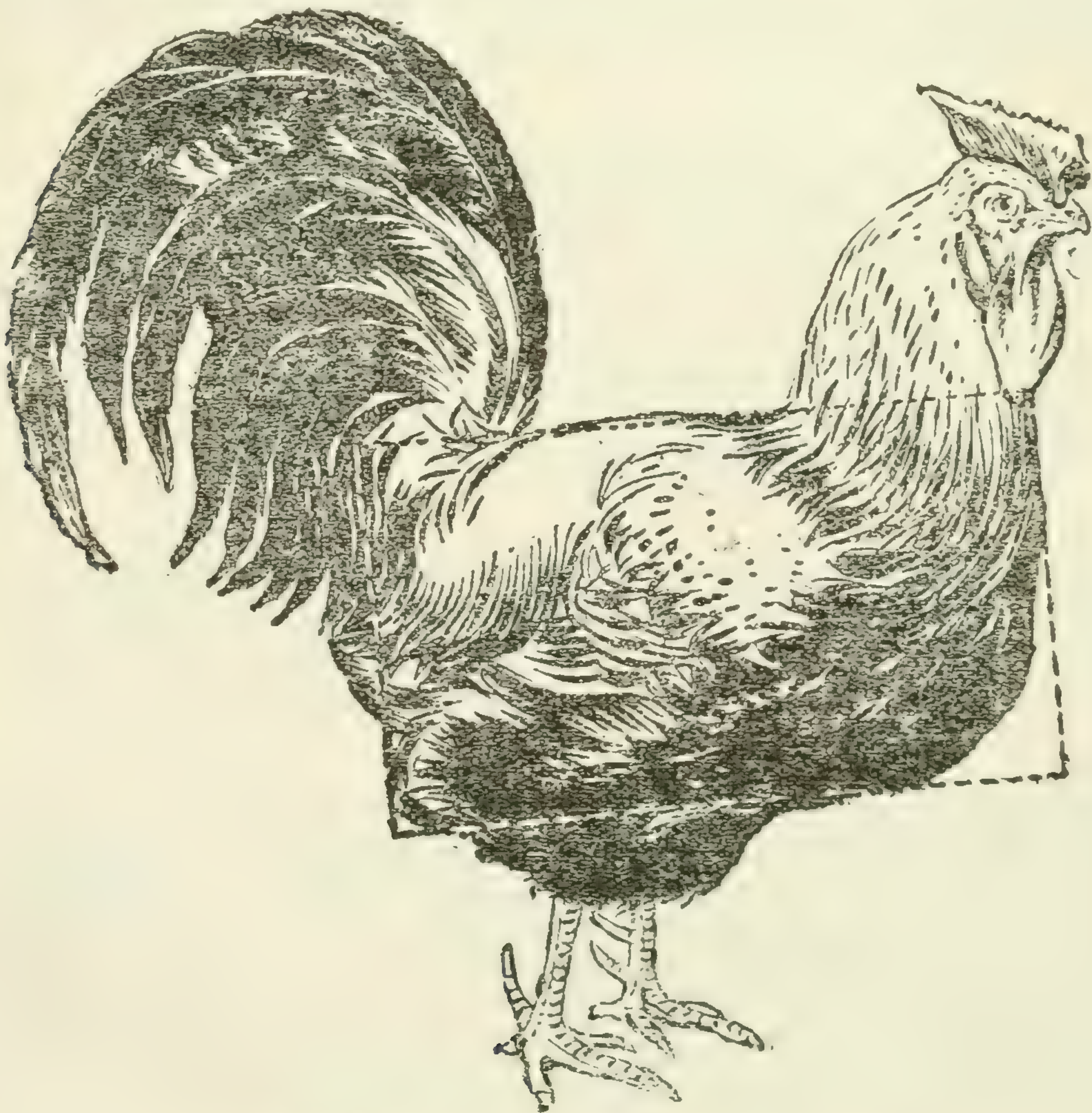
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DIFFERENCES BETWEEN THE TWO MARKETS.

One of the differences between the British and home market is that our consumers do not object to a large bird, which usually means a later one. Nor do our consumers have such pronounced objection to yellow tinge of flesh, or, leg. The later bird is somewhat an easier one to produce, certainly, but it comes when the market is well stocked with similar birds and prices are generally lower. It is obviously better to produce the earlier chickens. As a result of this difference in the phases of the two markets there is a possibility of a twofold opportunity for our farmers to make money by taking advantage of the early demand for export chickens and the later birds for home use. An objection to certain strains of 3 and 4 months old cockerels of standard breeds, is that of sharp and prominent breast bone with absence of flesh. In numerous cases noticed this has not been such a cause of complaint at 5, or 6 months of age. But we are warned, as already noted, that our birds of either age named and which would probably be of 7 or 8 pounds weight each, are too large for the English consumer. We then fall back on our later home market which (as already remarked), offers no such objection, provided the birds have been well fed and cared for and show flesh of good colour and fine grain, as a rule sure indications of tenderness. In no case should quality be of secondary consideration. It is gratifying to note from Dr. Boulton's letter that the quality of our birds is rapidly improving. Objection to sharp breast bone and yellow tinge of leg and flesh, the latter more particularly from the English consumer, experience has shown, can be overcome by breeding from selected birds.

TYPE SUITABLE FOR BOTH MARKETS.

The following is a type of an English market fowl. In this case it is represented by one of the Dorking varieties.



SUITABLE TYPE OF MARKET FOWL.

EARLY PENNING UP OF FOWLS.

On October 22 the following fowls were selected and put into pens in No. 1 house, of 8 x 14 feet with outside runs of 8 x 48 feet. They were fed the same rations as given to the other birds running at large in a field. This was done before winter laying had commenced and after the hens had moulted, and in order to ascertain if so penning and feeding the birds would cause them to lay earlier than those enjoying the greater range :—

12 Barred P. Rock hens, eggs laid in November.....	62
12 Light Bra. P. Rock hens (crossed) eggs laid in November...	35
12 Buff Leghorn hens, eggs laid in November.....	20
15 Barred P. Rock pullets, eggs laid in November.....	49
13 White " Pullets, eggs laid in November.....	11
6 Faverolle " " " "	15
<hr/>	<hr/>
70	192

The remaining 147 hens and pullets laid eggs, during the same time, to the number of 132. The advantage is apparently with the penned fowls.

COMMENCEMENT OF GENERAL WINTER LAYING.

The fowls of all breeds moulted well and were in good feather by middle of October. The same treatment and food were adopted, in order to secure an early moult, as described at length in report of last year. Winter laying began by the hens enumerated above and was fairly general by the beginning of December. The first pullets to lay were Barred Plymouth Rock, Light Brahma—P. Rock cross, Faverolle and Buff Leghorn. The average age at which laying began was five months.

RATIONS USED AND THEIR VALUE.

The following amounts are fed to 247 fowls at present :—

	Cts.
20 lbs. wheat.....	28
16 lbs. cut bone at 1c. per lb.....	16
16 lbs. ground grains for mash.....	22
Lime, grit and roots (mangels).....	3
	<hr/>
	69

The mash is composed of 7 lbs. shorts.....	7c.
4½ lbs. ground oats.....	8c.
4½ lbs. gluten meal.....	7c.
	<hr/>
	22c.

As in previous years the mash was fed 3 times per week and in the afternoon during winter. In feeding at this time it was considered less liable to retard the hens from exercise, which was occasionally the effect when fed in the morning. Much depends upon the conditions under which the hens live. If in an unheated house, a little hot mash for first ration, would likely be warming and stimulating, and attended with beneficial results. But where the house is warmed it is likely to be of more benefit when fed for last ration. As to quantity, as nearly as possible one pound, measured dry, to every 15 hens. Again this depends very much upon what close observation of the effect would dictate. Pullets might require a greater quantity. Members of the

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Spanish, or Mediterranean family would perhaps do better on a larger allowance, than that given to pullets of the Asiatic or American classes. And a hen, or pullet which is laying well is likely to eat more than a non-productive one.

CUT BONE,—was generally given in proportion of one pound to 15 or 20 hens.

Wheat, about 8 or 10 lbs to 100 fowls, according to their age and condition and nature of other rations. This grain was not all fed at one time, but from time to time so as to keep the fowls busy searching for it when thrown into the litter on the floor. And it was not fed when mash, or, cut bone was given. Oats were sometimes used to scatter in the litter. Occasionally buckwheat took the place of wheat, but the latter was the principal grain fed and is certainly the best, where there is no choice of variety.

Roots, lime and grit were always in supply, and water to drink was in abundance. Experience has shown that variety in food and times of feeding is desirable.

A correspondent recently wrote that treatment, according to the best advice he could receive, had failed to make his comfortably housed pullets, of early hatch, to lay so far. Another correspondent says the same of his hens and then describes the rations and quantities fed, which were very much more than should have been given to hens of a heavy breed. In the first instance it is quite possible that the pullets were from a strain of poor layers, particularly so in winter. To have early and satisfactory winter layers, they should come from parent hens well known as both. There are strains of poor laying fowls as there are strains of poor milch cows. The remedy is to make a change as soon as circumstances will permit. In the second case the hens were undoubtedly in an overfat condition, the result of mistaken generosity in the quantity of food given. The remedy is to lessen the amount fed, incite the fowls to as much exercise as possible, in searching for their food, and allow a liberal supply of roots. Lean meat, vegetables or roots and active exercise are factors in regaining the normal condition. Information in regard to the last mentioned condition of many flocks, of prospective winter layers, is so frequently asked that the information given, as to remedial action will likely be of interest to many.

EGGS LAID DURING THE YEAR.

The following are the number of eggs laid in the different months during the year :

1901.	
December.....	1,270
1902.	
January.....	1,982
February.....	1,937
March.....	2,392
April.....	2,584
May.....	1,814
June.....	1,015
July.....	367
August.....	288
September.....	132
October.....	20
November.....	324
	<hr/>
	14,125
	<hr/>

EGGS LAID IN THE MONTHS OF HIGHEST PRICES.

The following table will show the number of eggs laid by different breeds during six months of highest values. In making comparison, or comment it is well to remember that the experience of many years leads to the conclusion that the fowls which, as pullets lay well one winter may not do so the next as hens. It has also been found that the indifferent pullet layers of one season may be exceedingly good the year after, when hens. And so an average percentage is kept, which can only be correctly ascertained by comparing one season's results with another, for some years past.

Eggs laid by different breeds from December 1, 1901, to June 30, 1902.

Breeds.	1901.	1902.						Totals.	Remarks.
	Dec.	Jan.	Feb.	Mar.	April.	May.	June.		
10 W. Leghorn pullets...	82	141	103	133	90	89	52	690	As the season advanced the hens of sitting varieties became broody and eggs were given to them.
8 B. Minorca hens.....	41	48	44	100	147	115	53	548	
8 Andalusian hens.....	41	61	49	64	102	63	38	418	
8 Brown Leghorn hens..	52	102	98	143	178	134	50	757	
9 Langshan hens.....	79	108	116	101	90	66	44	604	
5 Langshan pullets.....	41	49	39	38	76	28	30	301	
10 B. P. Rock hens . . .	81	78	81	113	123	48	62	581	
28 B. P. Rock pullets...	92	267	260	324	348	211	100	1,602	
8 White P. Rock hens..	58	61	44	84	97	62	43	449	
14 White P. Rock pullets	67	108	132	167	166	101	73	814	
10 W. Wyandotte hens..	78	95	70	84	120	77	57	581	One of these pullets died in January.
15 W. Wyandotte pullets	74	132	150	166	142	66	73	893	
7 W. Ind. Game hens...	50	62	37	51	36	62	14	312	
4 Buff Orpington pullets	67	69	39	29	25	23	19	271	
4 Faverolle pullets .....	..	22	35	26	44	17	Brdy.	144
9 R. I. Red pullets.....	74	133	83	108	86	77	25	586	
7 Buff P. Rock pullets..	15	57	48	38	43	51	48	300	
14 Buff Leghorn hens...	81	45	68	148	141	111	41	635	
12 Buff Leghorn pullets..	60	88	74	72	84	86	24	488	
18 Mixed hens.....	89	156	164	230	202	143	65	1,049	
15 B. P. Rock pullets ...	48	98	199	157	217	157	86	962	
	1,270	1,975	1,933	2,376	2,557	1,787	997	12,895	

OTTAWA, December 2, 1902.

THE PRESERVATION OF EGGS.

BY FRANK T. SHUTT, M. A.,

Chemist, Dominion Experimental Farms.

Continuing this investigation, begun in 1898, we have during the past season repeated the trials with several of the preservative solutions previously reported upon, such as lime-water and sodium silicate (water glass), and also added to the list one or two, which appeared to be worthy of trial.

The solutions used were as follows : (1) saturated lime-water, (2) saturated lime-water containing 1 per cent common salt, (3) saturated lime-water containing 2 per cent common salt, (4) sodium silicate (water glass), 5 per cent (5) common salt, 1 per cent, (6) common salt, 2 per cent, (7) permanganate of potash, 0.25 per cent, (8) calcium chloride, 1 per cent, (9) calcium chloride, 2 per cent, (10) magnesium chloride, 2 per cent.

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In the case of the more important solutions, viz., lime-water, lime-water and common salt, and sodium silicate, the eggs were immersed February 7, 1902, and examined December 1, 1902. They were consequently kept a period of practically 10 months, during a large part of which time they would be subject to summer temperature. As in former years, the bottles containing the eggs were kept in the laboratory.

Saturated Lime-water.—The results with this solution were practically identical with those obtained in former seasons. Appearance, external and internal, good; 'white', tinged faintly yellow and somewhat more limpid than in fresh egg; yolk, globular and apparently normal. On poaching, several of the eggs developed a slightly 'stale' odour. Though not equal to fresh eggs in flavour, they were all quite sound and usable.

Saturated Lime-water and 1 per cent Salt.—These eggs, on the whole, were very similar to the preceding, though a careful rating showed those preserved simply in lime-water to be somewhat the better.

Saturated Lime-water and 2 per cent Salt.—'White', slightly limpid and more deeply tinged than eggs from foregoing tests. On poaching, very little difference, however, was to be observed between them.

Sodium silicate (water glass) 5 per cent Solution.—These eggs presented much the same appearance, externally and internally, as those preserved in lime-water.

Common Salt 1 per cent Solution.—The unsuitability of this solution was again demonstrated, the eggs possessing a most marked and disagreeable odour.

Common Salt 2 per cent Solution.—As in the trial of 1901, the eggs in this solution were quite spoilt and unusable.

Potassium Permanganate 0.25 per cent.—This solution is frequently mentioned in the press as a good egg preservative, but in our experiments it has proved totally unsuccessful. All the eggs were bad.

Calcium Chloride 1 per cent.—A large proportion of the eggs were unusable. The 'white' very limpid and highly discoloured; odour, disagreeable.

Calcium Chloride 2 per cent.—Very similar results to those of preceding test. Evidently neither solution is to be regarded as a satisfactory preservative.

Magnesium Chloride 2 per cent.—All the eggs spoilt and very bad. 'White', very limpid and highly discoloured. Contents of eggs, of unpleasant appearance generally and possessing very bad smell.

For further details respecting the condition of eggs kept in lime-water, and some of the more important solutions experimented with, the reader is referred to page 332-334 of the Annual Report of the Experimental Farms for 1901. The general results were so similar this year that it has been thought unnecessary to repeat the particulars.

CONCLUSIONS.

This fifth season's work with egg preservatives furnishes further corroboratory evidence of the value of lime-water. Of all the solutions experimented with, it has proved the most satisfactory. It is certainly equal to water-glass in effectiveness and is to be preferred to this much advertised preservative on the grounds of economy and ease of preparation.

The following note regarding the preparation of the lime-water may be found useful:—

The solubility of lime at ordinary temperatures is 1 part in 700 parts of water. Such a solution would be termed saturated lime-water. Translated into pounds and gallons, this means 1 lb. of lime is sufficient to saturate 70 gallons of water. However owing to impurities in commercial lime, it is well to use more than is called for in this statement. It may not, however, be necessary, if good, freshly burnt quicklime can be obtained, to employ as much as was at first recommended, namely, 2 to 3 lbs. to 5 gallons of water. With such lime as is here referred to one could rest assured that 1 lb. to 5 galls. (50 lbs.) would be ample, and that the resulting lime-water would be thoroughly saturated. The method of preparation is simply to slack the lime with a small quantity of water and then stir the milk of lime so formed into 5 gallons of water. After the mixture has been kept well stirred for a few hours it is allowed to settle. The superna-

tant liquid, which is now 'saturated' lime-water is drawn off and poured over the eggs, previously placed in a crock or water-tight barrel.

As exposure to the air tends to precipitate the lime (as carbonate), and thus to weaken the solution, the vessel containing the eggs should be kept covered. The air may be excluded by a covering of sweet oil, or with sacking upon which a paste of lime is spread. If after a time there is any noticeable precipitation of the lime, the lime-water should be drawn or siphoned off and replaced with a further quantity newly prepared.

It is essential that attention be paid to the following points :—

1. That perfectly fresh eggs only be used.
2. That the eggs should throughout the whole period of preservation be completely immersed.

Although not necessary to the preservation of the eggs in a sound condition, a temperature of 40° F. to 45° F. no doubt materially assists towards retaining a good flavour, or rather in arresting that 'stale' flavour so characteristic of packed eggs.

EXPERIMENTS IN CHICKEN FATTENING.

BY FRANK T. SHUTT, M.A., F.I.C.

Chemist, Dominion Experimental Farms.

There is probably no branch of agriculture in Canada regarding which, to-day, there is a greater desire for information than that of chicken fattening. The high prices paid for properly fatted, or perhaps more correctly speaking, fleshed young poultry, both in the home and English markets have already had the effect of inducing many to enter upon this lucrative employment, and many more will engage in it as the requisite knowledge becomes disseminated, for we are assured on good authority there is relatively as much room for the development of this industry as there was years ago in Canada for the expansion of that of butter and cheese.

Recognizing this, the Chemical Division in conjunction with the Poultry Department of the Central Farm, instituted and carried on during the past season several series of feeding experiments, which, though of a preliminary character, would it was hoped furnish information of an accurate and reliable character on this important work. This investigation naturally had for its chief object the study of fattening rations, but certain other factors closely related to profitable fattening, such as breed, age, exercise, relative fineness of food, &c., also received attention.

FOODS AND RATIONS.

Fowls may be said to be naturally omnivorous; they feed not only on vegetable matter (grains, grass, &c.), but also largely on insect life. This fact points to a ration for poultry richer in albuminoids than is usually found economical for other classes of farm stock. Practical experience with laying hens has shown this to be correct—which is not at all remarkable when we remember that eggs are very largely albumen. Further, there are on record the data of carefully conducted experiments which also indicate such a ration to be best suited for fattening chickens. Foods rich in carbo-hydrates (starch) and fat and low in albuminoids tend to excessive deposition of fat, an undesirable feature in both laying stock and table fowl.

Rations of the first order, rich in protein or albuminoids, are said to have a narrow nutritive ratio and are sometimes termed nitrogenous. They would, for poultry, contain in addition to the grain or meal, crushed green bone, meat meal or skim-milk, all of which have a high protein content.

Rations of the second class have a wide nutritive ratio, and are commonly known as carbonaceous, since starch and fat (rich in carbon) predominate. Such a diet, for instance, would be one consisting largely or entirely of Indian corn—a popular and favourite grain among many poultry keepers—but one that must be used sparingly if satisfactory results are to be expected.

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It is not our purpose at the present time to discuss more fully the question of foods and their functions in the animal economy, for that has already been done in the report of the Chemical Division of the Expt. Farms for 1900, p. 166-7, to which the reader may be referred. There are probably one or two points, however, in connection with poultry feeding that might be emphasized here. They are, first, the desirability of variety in foods, and, secondly, the advisability of a certain amount of exercise. As to the first of these, variety of food (apart from the question of quality) is essential towards keeping the appetite keen, promoting digestion and maintaining health. This has been demonstrated by the supplementary use of green food as furnished by the sodded run in summer and beets, mangels, or cabbage in winter. Respecting the second, the value of exercise, it may be stated that assimilation must be preceded by digestion and that for vigorous digestion in the fowl there must not only be grit supplied, but a strongly muscular gizzard to do the grinding, which can only be developed by exercise. Further, though the function of the gizzard proper is to grind the food, its first division, or rather the part of the digestive track between the crop and the gizzard secretes a fluid of a digestive value and is the true digestive stomach, and we may well suppose that this important function can only normally proceed under normal conditions, which for poultry certainly include exercise. The present investigation has, we are of opinion, furnished data substantiating this contention, for as will be seen further in this article, chickens with a limited run made better use of their food towards flesh production than those confined in coops which allowed no exercise.

BREED TEST.

To ascertain the relative merits of certain breeds for fattening.

This comprised eight well known breeds and a pen of crosses, as follows: Barred Plymouth Rock, White Plymouth Rock, Faverolle, Silver-gray Dorking, Orpington, Rhode Island Red, White Indian Game, White Wyandotte, cross of Barred Plymouth Rock and Light Brahma. The experiment was begun in June and continued for six weeks.

It was found impossible to obtain chickens for the whole series of exactly the same age, but the majority—as will be seen from the table—were two months old when placed in the feeding pens.

The chickens were fed in pens 8 by 14 feet (divisions of the Farm Poultry House) connected with outside runs 8 by 48 feet, partly sodded, partly gravelled, to which the fowls had access throughout the day. The food, served twice a day, was placed in small, water-tight, V-shaped troughs and only given in such quantity that it would be immediately consumed.

In this series whole grain (wheat) was fed as part (from $\frac{1}{3}$ to $\frac{1}{4}$, as a rule) of the ration; in subsequent experiments all the food was in the condition of meal, it being found, as will be shown by one of our experiments, that ground grain gives more profitable returns for fattening birds.

<i>Ration</i> —Ground oats.....	4 parts.	} Protein ratio 1:3.94.
Ground barley.....	3 "	
Meat meal.....	1 "	
Skim-milk.....	Sufficient to make the whole into a mash.	

The mixture of oats, barley, and meat meal was valued at $1\frac{1}{3}$ cents per pound. To the skim-milk the value of 15c. per 100 lbs. was assigned.

As stated, the above was supplemented by an evening feed of whole wheat, valued at $1\frac{1}{10}$ c. per lb.

A strict account of all food consumed was kept and the chickens were weighed at the close of each week of the experiment.

In table I. We present data respecting (1) breed, (2) age, (3) sex, (4) weight at beginning of test and at end of each following week, (5) gain in live weight during the six weeks, and (6) average gain per chicken per week.

TABLE I.—BREED TEST.

Breed and Age.	Pullet or Cockerel.	WEIGHT.												Gain in six weeks.	Average gain per Chicken per week.				
		Beginning of experi- ment.		1st. week.		2nd. week.		3rd. week.		4th. week.		5th. week.					6th. week.		
		Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.		Lbs.	Oz.	Lbs.	Oz.	
Barred Plymouth Rock, 2 months...	C	2	8	2	13	3	2	3	9	4	1	4	8 ¹ / ₂	4	12	2	4	0	6
" " " "	C	2	2 ¹ / ₂	2	6	2	10	3	2	3	14	4	4	4	5 ¹ / ₂	2	5	0	6 ¹ / ₂
" " " "	C	1	15	2	3 ¹ / ₂	2	8	3	1	3	8	3	11	4	2 ¹ / ₂	2	3 ¹ / ₂	0	6
" " " "	C	2	0	2	5	2	14 ¹ / ₂	3	6	3	8	4	4 ¹ / ₂	4	9 ¹ / ₂	2	9	0	7
" " " "	C	1	9	1	15	2	4 ¹ / ₂	2	11	2	14	3	2 ¹ / ₂	3	8	1	15	0	5 ¹ / ₂
White Plymouth Rock, 2 months...	P	1	1 ¹ / ₂	1	6 ¹ / ₂	1	11	2	0	2	6	2	9 ¹ / ₂	2	14	1	14	0	5
" " " "	P	0	15	1	3 ¹ / ₂	1	8 ¹ / ₂	1	13	2	2 ¹ / ₂	2	3 ¹ / ₂	2	6 ¹ / ₂	1	7 ¹ / ₂	0	4
" " " "	P	1	1	1	8	1	15	2	6	2	10	2	15	3	3	2	2	0	5 ¹ / ₂
" " " "	P	0	14 ¹ / ₂	1	4 ¹ / ₂	1	10 ¹ / ₂	2	1	2	7	2	8 ¹ / ₂	2	14	1	15 ¹ / ₂	0	5 ¹ / ₂
" " " "	P	0	15	1	4	1	10 ¹ / ₂	2	1 ¹ / ₂	2	8	2	11	3	0	2	1	0	5 ¹ / ₂
" " " "	P	0	15	1	4	1	9	1	15	2	4	2	7 ¹ / ₂	2	14	1	15	0	5 ¹ / ₂
Faverolle, 2 months.....	C	1	14	2	8 ¹ / ₂	2	14 ¹ / ₂	3	3 ¹ / ₂	3	11 ¹ / ₂	4	1 ¹ / ₂	4	6 ¹ / ₂	2	8 ¹ / ₂	0	6 ⁵ / ₈
" " " "	C	1	12 ¹ / ₂	2	8	2	13	3	2	3	11	4	3	4	7 ¹ / ₂	2	11	0	7 ¹ / ₂
" " " "	C	1	7	2	0	2	5 ¹ / ₂	2	10 ¹ / ₂	3	2	3	6 ¹ / ₂	4	0	2	9	0	6 ⁵ / ₈
" " " "	P	1	13 ¹ / ₂	2	5	2	9 ¹ / ₂	2	13	3	1	3	7	3	12 ¹ / ₂	1	15	0	5 ¹ / ₂
" " " "	P	1	11 ¹ / ₂	2	5	2	10	2	14	3	4	3	5	3	13	2	1 ¹ / ₂	0	5 ¹ / ₂
" " " "	P	1	3	1	11	2	0	2	4	2	10	2	15	3	4 ¹ / ₂	2	1 ¹ / ₂	0	5 ¹ / ₂
Silver Gray Dorking, 2 months.....	C	1	5 ¹ / ₂	1	13	2	2	2	5 ¹ / ₂	2	11	2	15	3	5 ¹ / ₂	2	0	0	5 ¹ / ₂
" " " "	C	2	2 ¹ / ₂	2	14	3	4 ¹ / ₂	3	10	4	2	4	6	4	12	2	9 ¹ / ₂	0	7
" " " "	C	1	10 ¹ / ₂	2	0	2	4	2	12 ¹ / ₂	3	0	3	6	3	14 ¹ / ₂	2	4	0	6
" " " "	C	1	5 ¹ / ₂	1	15	2	4	2	7 ¹ / ₂	2	10 ¹ / ₂	2	15	3	5 ¹ / ₂	2	0	0	5 ¹ / ₂
" " " "	C	1	11	2	6	2	15	3	5	3	14 ¹ / ₂	4	4 ¹ / ₂	5	1 ¹ / ₂	3	6 ¹ / ₂	0	9 ¹ / ₂
" " " "	C	1	5 ¹ / ₂	1	14	2	5	2	13	3	4	3	8	3	12 ¹ / ₂	2	7	0	6 ¹ / ₂
Buff Orpington, 2 months.....	P	1	6 ¹ / ₂	1	14 ¹ / ₂	2	4 ¹ / ₂	2	9 ¹ / ₂	2	13 ¹ / ₂	2	15	3	5 ¹ / ₂	1	15	0	5 ¹ / ₂
" " " "	C	2	0	2	10	3	1	3	8 ¹ / ₂	4	0	4	6	4	14	2	14	0	7 ¹ / ₂
" " " "	C	1	12	2	6	2	15	3	5	3	13	4	4 ¹ / ₂	4	14	3	2	0	8 ¹ / ₂
" " " "	P	1	8	1	14 ¹ / ₂	2	4 ¹ / ₂	2	9	2	14 ¹ / ₂	3	2	3	9	2	1	0	5 ¹ / ₂
" " " "	P	1	8 ¹ / ₂	1	15	2	3	2	8 ¹ / ₂	2	13	3	1 ¹ / ₂	3	6 ¹ / ₂	1	14	0	5
" " " "	P	1	5	1	13	2	2	2	7 ¹ / ₂	2	10 ¹ / ₂	2	15	3	5 ¹ / ₂	2	1 ¹ / ₂	0	5 ¹ / ₂
Rhode Island Red, 2 months.....	C	1	8	1	15	2	4	2	8 ¹ / ₂	2	13	3	1 ¹ / ₂	3	5 ¹ / ₂	1	13 ¹ / ₂	0	5
" " " "	C	1	10	2	1	2	6	2	10	2	14 ¹ / ₂	3	4 ¹ / ₂	3	7 ¹ / ₂	1	13 ¹ / ₂	0	5
" " " "	C	1	9 ¹ / ₂	2	1 ¹ / ₂	2	7 ¹ / ₂	2	12	3	6	3	4 ¹ / ₂	3	10	2	1 ¹ / ₂	0	5 ¹ / ₂
" " " "	C	1	2	1	6 ¹ / ₂	1	12	2	3	2	7	2	14	3	2 ¹ / ₂	2	1 ¹ / ₂	0	5 ¹ / ₂
" " " "	P	1	4	1	10	1	15 ¹ / ₂	2	2	2	5	2	6 ¹ / ₂	2	9 ¹ / ₂	1	5 ¹ / ₂	0	5 ¹ / ₂
White Indian Game, 2 months.....	P	0	12 ¹ / ₂	1	0	1	5	1	9 ¹ / ₂	1	13 ¹ / ₂	2	0	2	7	1	10 ¹ / ₂	0	4 ¹ / ₂
" " " "	P	1	1 ¹ / ₂	1	4	1	8	1	12 ¹ / ₂	1	15 ¹ / ₂	2	2	2	9	1	8 ¹ / ₂	0	4 ¹ / ₂
" " " "	P	0	15	1	2	1	6 ¹ / ₂	1	12	1	14	2	0	2	3	1	4	0	3 ¹ / ₂
" " " "	P	0	15	1	3 ¹ / ₂	1	8	1	12 ¹ / ₂	1	15 ¹ / ₂	2	2	2	7 ¹ / ₂	1	8 ¹ / ₂	0	4 ¹ / ₂
White Wyandotte, 11 weeks.	C	2	14	3	12	4	6	4	5 ¹ / ₂	4	11	5	3	5	10	2	12	0	7 ¹ / ₂
" " " "	C	2	6	3	2 ¹ / ₂	3	11	3	14	4	1	4	6	4	13 ¹ / ₂	2	7 ¹ / ₂	0	6 ³ / ₈
" " " "	C	2	7 ¹ / ₂	3	5	3	13	4	4	4	4	4	5 ¹ / ₂	4	13 ¹ / ₂	2	6	0	6 ¹ / ₂
" " " "	C	2	6 ¹ / ₂	3	1	3	9 ¹ / ₂	4	1 ¹ / ₂	4	1 ¹ / ₂	4	5	4	12	2	5 ¹ / ₂	0	6 ¹ / ₂
" " " "	C	2	4	2	14	3	6 ¹ / ₂	3	11	3	13 ¹ / ₂	4	3	4	7 ¹ / ₂	2	3 ¹ / ₂	0	6
" " " "	C	2	3	3	1	3	11 ¹ / ₂	4	2	4	1 ¹ / ₂	4	7	4	14	2	11	0	7 ¹ / ₂
Plymouth Rock and Light Brahma Cross, 9 weeks.....	C	2	6 ¹ / ₂	3	5	3	11 ¹ / ₂	4	6	5	0	5	1	5	12	3	5 ¹ / ₂	0	9
" " " "	C	3	3	3	15 ¹ / ₂	4	7 ¹ / ₂	4	15 ¹ / ₂	5	3 ¹ / ₂	5	4 ¹ / ₂	5	7	2	4	0	6
" " " "	C	2	7	3	4	3	14	4	5	4	11	5	0	5	5 ¹ / ₂	2	14 ¹ / ₂	0	7 ¹ / ₂
" " " "	C	2	10	3	7 ¹ / ₂	4	0	4	9	4	14	5	1	5	12	3	2	0	8 ¹ / ₂
" " " "	C	2	7 ¹ / ₂	3	4	3	10	4	3	4	13	5	2 ¹ / ₂	5	9	3	1 ¹ / ₂	0	8 ¹ / ₂
" " " "	C	2	11	3	12	4	4	5	1	5	7 ¹ / ₂	5	13 ¹ / ₂	6	5	3	10	0	9 ¹ / ₂

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We have evidence in these foregoing data, (*a*) of the variation that may occur in growth in the same chicken from week to week during the feeding period, (*b*) of the differences in increase in weight that may result among birds of the same breed and sex, (*c*) of the difference between pullets and cockerels as regards gains in weight, and (*d*) of the relative merits of the breeds experimented with, in flesh production.

(*a*.) Regarding the first mentioned feature, it is only possible at the present time to say that we found the chief cause to be the weather, or rather the temperature, though undoubtedly age and health were frequently factors. During weeks of excessive heat the usual gains were always reduced.

(*b*.) What we may term individualism is as strong among fowls as in other classes of live stock. Vitality, constitutional vigour and ability to digest and assimilate food are not meted out alike to all, and though there is no apparent cause, lack of thrift is not uncommonly to be observed in some members of a hatch.

(*c*.) In every pen made up of the two sexes it will be invariably found that the cockerels made the larger gains. This is an important fact, though not perhaps a new one to most poultrymen, confirming the wisdom of fattening the cockerels and keeping the pullets for eggs.

(*d*.) The evidence as to the relative merits of the breeds as fatteners will perhaps be clearer from a perusal of Table II., presenting data as to gains in weight, of food consumed and of its cost, and of cost of food per pound of increase in live weight, of the various pens under test in this experiment.

TABLE II.—BREED TEST.

BREED.	No. OF CHICK-ENS.		Weight at beginning of experiment.		Weight at close of experiment.		Total increase in weight.		Average increase in weight per chicken.		FOOD CONSUMED.			Total cost of food.	Cost of food per lb. increase in live weight.	
	Pullets.	Cockerels.									Wheat.	Mixed meal.	Skim-milk.			
			Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Cts.	Cts.
Barred Plymouth Rock....	....	5	10	0	21	6	11	6	2	5	13	5	21	4	46	4.0
White Plymouth Rock....	6	....	5	13	17	4	11	7	1	15	4	13	25	3	44	3.8
Faverolle.....	3	3	9	13	23	12	13	15	2	5	8	11	28	11	53	3.8
S. G. Dorking.....	....	6	9	8	24	3	14	11	2	7	8	6	29	11	57	3.8
Orpington.....	4	2	9	8	23	7	13	15	2	5	6	10	29	0	53	3.8
Rhode Island Red.....	1	4	7	1	16	3	9	2	1	13	5	7	25	0	43	4.7
White Indian Game.....	4	....	3	11	9	10	5	15	1	8	3	14	15	7	27	4.5
White Wyandotte..	... 6		14	8	29	7	14	15	2	8	10	14	32	4	63	4.2
Crosses(P. R. x L. B.)..	.... 6		15	13	34	13	19	0	3	2	29	14	27	3	71	3.7

The facts in Table II. furnish a basis for discussion as to the relative economy with which the different breeds were fed.

In the first place it is to be noted that the cost of production (food only), did not exceed in any case 4.7 cents per pound of live weight, and that this figure was only reached in one pen, which for some unknown reason lacked the thrift noticeable in all the others.

The cheapest flesh production was obtained with the Light Brahma-Plymouth Rock cross at 3.7 cents per pound, but this was very closely followed by White Plymouth Rock, Faverolle, Silver-Gray Dorking and Buff Orpington, at 3.8 cents per pound, of increase. Barred Plymouth Rock at 4 cents, White Wyandotte at 4.2 cents, White Indian Game at 4.5 cents, and Rhode Island Red at 4.7 cents per pound complete the list of those under trial.

It is quite possible that the cost per pound of increase would have been somewhat lower in the case of the White Wyandottes if the test could have been made with two-months old birds, as in the other pens.

The White Indian Game, generally speaking, is small and can scarcely be considered a marketable table bird, though they have the good quality of putting flesh on the breast, and further, the meat is much esteemed for its flavour by some. It was for these reasons that they found a place in this experiment.

WHOLE *versus* FINELY GROUND GRAIN.

To ascertain the comparative values of whole grain and meal—the composition of the ration being the same in both cases.

This experiment was conducted with two sets (6 in each) of Barred Plymouth Rock cockerels all of which were of the same age, about twelve weeks old at the commencement of the test. The special feeding trial lasted six weeks. Pens with runs as already described were used. The ration for both lots of chickens consisted of:—

Oats.....	4 parts	} Protein ratio 1 : 3·94
Barley.....	3 “	
Meat meal.....	1 “	
Skim-milk		

For one set of chickens the oats and barley were fed whole; for the other set these grains were first finely ground. The same amount of skim-milk was fed to each pen, being used in making the mash in the case of the birds fed on ground meal, and given as a drink to the chickens getting the whole grain ration.

TABLE III.—WHOLE *vs.* FINELY GROUND GRAIN, WITH BARRED PLYMOUTH ROCKS.

Lot and Ration.	Pullet or Cockerel.	WEIGHT.														Gain in six weeks.	Average gain per chicken per week.		
		Beginning of experiment.		1st week.	2nd week.	3rd week.	4th week.	5th week.	6th week.										
		Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.				
Lot A—Whole grain.	C	3	2	3	8	3	10½	3	12½	4	0	4	9½	4	12½	1	10½	0	4½
	C	3	3	3	14	4	1½	4	5	4	3	4	12	5	12½	1	13½	0	5
	C	2	13½	3	9	3	15	4	8	4	13	5	3	5	7	2	9½	0	7
	C	3	6½	3	10½	3	10	3	13½	3	6	3	12½	4	2½	0	12	0	2
	C	3	8	4	0	4	0	4	9½	4	12	4	3	4	7	0	15	0	2½
	C	3	8	4	2½	4	11½	5	2	4	15	5	8½	5	11½	2	3½	0	6
Lot B—Finely ground grain	C	2	12½	3	9	4	0	4	4	4	12	5	½	5	4	2	7½	0	6¾
	C	3	8½	4	6½	4	9	5	7	5	7½	6	0	5	14	2	5½	0	6½
	C	3	11½	4	6	4	14	5	8	5	12	5	15	6	5	2	9½	0	7
	C	3	0	4	0	4	11½	5	7½	5	15	6	7	6	7	3	7	0	9½
	C	3	1½	3	15	4	5	5	1	5	8	5	12	6	6	3	4½	0	8½
	C	2	8	3	3½	3	11	4	3	4	5	4	12	4	14	2	6	0	6½

Though individualism or variation among the members of a pen in thrift is to be observed here as in all other experiments, the difference in favour of the ground feed is well marked. The two last columns of Table III. (gains in six weeks and average gain per chicken per week) furnish emphatic and readily understood data on this point.

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Since the conditions of this experiment were identical in all respects save that of the relative coarseness of the food, we must conclude that the larger gains made by Lot B. were the result simply of feeding the ration in a finely ground state. The six birds of Lot A. (whole grain) showed an increase in weight of 10 lbs., while those of Lot B. (finely ground meal) gained 16 lbs. 8 oz.

TABLE IV.—WHOLE vs. FINELY GROUND GRAIN, WITH BARRED PLYMOUTH ROCKS.

Lot and Ration.	No. of CHICKENS.		Weight at beginning of experiment.	Weight at close of experiment.	Total increase in weight.	Average increase in weight per chicken.	FOOD CONSUMED.				Total cost of food.	Cost of food per lb. increase in live weight.
	Pullets.	Cockerels.					Grain, Whole or Finely ground.		Skim-milk			
							Lbs.	Oz.	Lbs.	Oz.		
Lot A—Whole grain	6		19 9	29 9	10 0	1 10½	59 1	42 0	71	7.1		
Lot B—Finely ground grain	6		18 10	35 2	16 8	2 12	66 8	42 0	93	5.6		

In Table IV. particulars of the food consumed, its cost and cost of food per pound of increase in live weight are summarized. The deductions therefrom are easily made. The six birds on finely ground food ate more than those on whole grain, but their increase in weight cost less per pound. Thus we find that although Lot B. (finely ground food) consumed food to the value of 22c. more than that of lot A., the former chickens by reason of the larger increase in weight put on flesh at a cost of 1½ cents per lb. less than the birds on the whole grain ration.

At the expiration of the feeding term the 12 birds were killed and dressed, and the following summary has been drawn up from the data obtained :—

PROPORTION of Edible and Non-edible parts, calculated on weight of chicken as killed.

Lot and Ration.	Edible.		Non-edible.		
	Dressed Carcase.	Giblets.	Head and feet.	Feathers.	Entrails, contents of gizzard, &c.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Lot A—Whole grain	62·2	6·8	11·5	7·6	11·9
Lot B—Finely ground grain	67·2	5·4	11·2	8·0	8·2

This shows a difference of 5 per cent in dressed carcase in favour of the finely ground food chickens. These birds further, it may be remarked, were plumper, slightly yellower, and of better appearance than the birds fed on the whole grain ration, and were also considered to furnish on cooking the juicier or richer meat, due evidently to a marked (though not excessive) deposition of fat in the tissues.

SKIM-MILK *versus* WATER.

To ascertain the value of skim-milk in fattening poultry.

This experiment was conducted in duplicate, in the one case employing an equal number of Rhode Island Red and Orpington in each pen, and in the other, made considerably later in the season, Barred Plymouth Rocks.

The ration consisted of :—

Ground oats.....	4 parts.	} Protein ratio 1 : 3·94.
Ground barley.....	3 "	
Meat meal.....	1 "	

For six birds in each experiment this was mixed with *skim-milk* ; for the remaining six, *water* was used in making the mash.

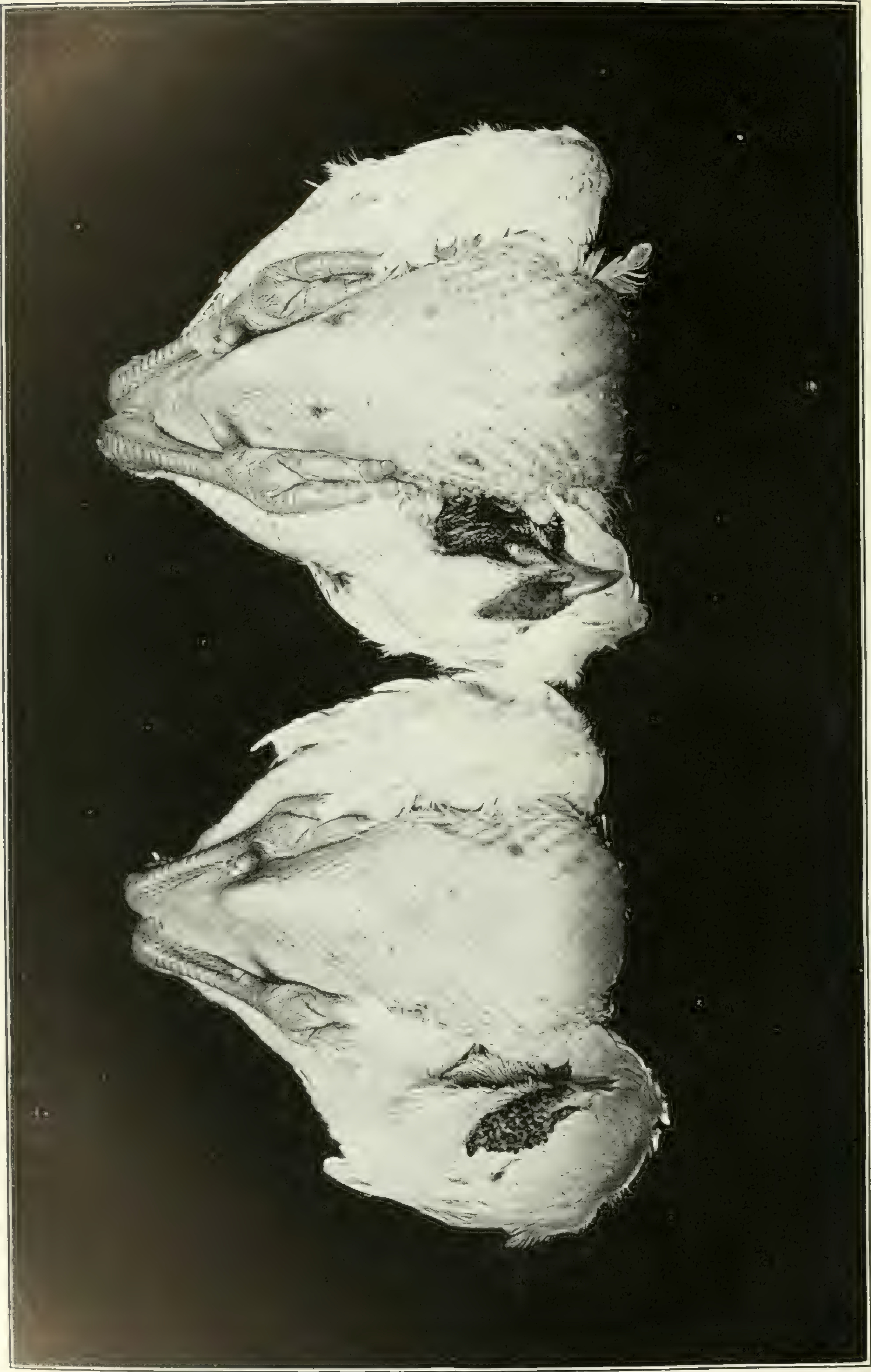
Both feeding trials were carried on in the pens with runs attached, and were of six weeks duration.

TABLE V.—SKIM-MILK *versus* WATER

No. 5.—Rhode Island Red and Orpington. No. 6.—Barred Plymouth Rock.

Ration.		Number of chicken.	Pullet or Cockerel.	WEIGHT.												Gain in six weeks.		Average gain per chicken per week.		
				Beginning of experiment.		1st week.		2nd week.		3rd week.		4th week.		5th week.						6th week.
No. 5.				Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	
Milk..	{	R. I. R.....	10	C	2	6	3	2	3	10½	4	0	4	4	4	11	5	0	2	10
			9	P	1	15½	2	6½	2	8	3	0	3	1	3	4	3	8	1	8½
			83	P	2	1½	2	8½	2	15	3	5	3	6½	3	6½	3	11	1	9½
		Orpington	20	C	2	0	2	12	3	1½	3	9	3	13	4	6	4	10½	2	10½
			27	P	2	1	2	9	2	14½	3	0	3	2	3	6½	3	11½	1	10½
		26	C	1	11	2	4	2	12½	3	3	3	8	4	1½	4	4	2	9	
Water	{	R. I. R.....	12	C	1	15	2	5	2	11½	3	0	3	1	3	8½	4	0	2	1
			18	C	1	14½	2	7	2	12	2	13½	2	13½	2	15	2	10	1	1½
			94	P	1	14½	2	6½	2	12	3	0	3	0	3	3½	3	7½	1	9
		Orpington.....	82	P	1	5½	1	13	2	3½	2	8	2	8	2	15	3	4½	1	15
			88	C	1	11	2	3½	2	10½	3	½	3	3	3	7½	3	12½	2	1½
		21	C	2	5	2	14½	3	6	3	11½	3	14	4	3½	4	8½	2	3½	
No. 6.																				
Milk, Barred Plymouth Rocks.	{		71	C	3	7	4	0	4	2½	4	11½	5	4	5	8	5	13½	2	6½
			73	C	3	4½	3	14	4	4	4	13	5	4	5	10½	5	15	2	10½
			74	C	3	4½	3	15	4	4	4	15	5	6	5	13	6	2	2	13½
			76	C	4	0	4	6	4	13½	5	6	5	10	6	1	6	7	2	7
			80	C	4	4½	5	3½	5	5	6	2	6	10	6	15½	7	9	3	4½
			81	P	2	15	3	5½	3	8½	4	1	4	6½	4	11	5	0	2	1
Water, Barred Plymouth Rock	{		70	C	3	9½	3	12	3	12	4	4½	4	11½	5	2½	5	9½	2	0
			72	C	3	4½	3	10½	3	11	4	4½	4	12	5	2½	5	10	2	5½
			78	C	3	14	4	5	4	8	5	½	5	9½	6	0	6	0	2	2
			79	C	4	½	4	6	4	5	4	8½	4	8½	4	12	4	15	0	14½
			81	C	3	4½	3	11	3	11	4	4	4	8½	4	15½	5	8	2	3½
			84	P	2	14½	3	5½	3	8½	3	13½	4	4½	4	7	4	14	1	15½





WHITE WYANDOTTE CHICKENS, 15 WEEKS OLD. WEIGHTS, 5 LBS. 3 OZS.; 4 LBS. 7 OZS.

—Photo. by Frank T. Shutt.

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TABLE VI.—SKIM-MILK *versus* WATER.

No. 5.—Rhode Island Red and Orpington. No. 6.—Barred Plymouth Rock.

Ration.	Number.	Cockerel or Pullet.	Weight at beginning of experiment.		Weight at close of experiment.		Total increase in weight.		Average increase in weight per chicken.		Weight of mixed meal.		Weight of skim-milk.		Total cost of food.	Cost of food per lb. of increase in live weight.
			Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Cts.	Cts.
No. 5.																
A.—Milk	6	{ P 3 C 3 }	12	3	24	13	12	10	2	2	40	13	46	0	60	4 7
B.—Water.....	6	{ P 2 C 4 }	11	½	21	11	10	10½	1	13	41	3	.....		53	5·0
No. 6.																
A.—Milk.....	6	{ P 1 C 5 }	21	3½	36	14	15	11	2	10	61	10	58	0	89	5·7
B.—Water.....	6	{ P 1 C 5 }	20	15½	32	8	11	8½	1	15	60	7	.....		78	6·7

Rhode Island Red and Orpington.—Commenced August 1. These chickens were about 2½ months old when the experiment began. They made a fair but somewhat uneven growth. The pen receiving skim-milk made the larger increase in weight, and produced that increase at a less cost per pound. The amount of meal eaten was almost the same in both pens, but the additional skim-milk made the total cost of food in ration A somewhat greater (see Table VI). Nevertheless, as already stated, the skim-milk ration proved the more profitable.

Barred Plymouth Rock.—Commenced September 8. Age of chickens, between 2½ and 3 months. The fowls exhibited more general thrift than those of the previous experiment, the gains being larger and more regular. The results again furnish evidence as regards the superiority of the skim-milk ration ; indeed, the testimony on this point is more emphatic, for the cost of production was 1 cent per pound of increase less than with the water-mash pen, while in the former test it was only ⅓ cent.

These fowls were fasted, killed and dressed, and weights taken of their various parts.

PROPORTION of Edible and Non-edible parts, calculated on weight of chicken as killed.

Ration.	Edible.		Non-edible.		
	Dressed carcass.	Giblets.	Head and feet.	Feathers.	Entrails, contents of gizzard, &c.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Milk.....	68·9	5·1	11·0	8·6	6·4
Water	66·8	5·5	11·4	8·1	8·2

The milk ration chickens were decidedly better in appearance, being plumper and slightly yellower and were considered on cooking to furnish a juicier, richer flavoured meat.

PEN *versus* CRATE.

To ascertain the Relative Merits of Pen and Crate in Fattening Poultry.

An important question in poultry fattening—especially for the farmer—is, must the chickens be fed in coops or crates in order to fatten properly and give profitable returns?

To obtain some information on this point, two experiments have been made, the first with Silver-gray Dorking pullets, the second with Barred Plymouth Rock cockerels. In each, six birds were fed in the pens with runs attached, as already described, and six in ordinary fattening coops with slat bottoms. The coops were continuous, but separated by board partitions, the dimensions of each compartment being 17 inches deep, 11 inches wide and 19 inches high. The birds were fed singly. The V-shaped feeding trough was suspended outside the range or row of coops, provision being made for grit in front of each coop by means of partitions.

The ration was alike for birds in pens and coops, as follows:—

Ground oats.....	4 parts.	} Protein ratio 1 : 3·94
Ground barley.....	3 “	
Meat meal.....	1 “	

made into a mash with skim-milk.

Silver-gray Dorking.—Commenced July 22, age of chickens (all pullets) between 10 and 11 weeks. Experiment continued for four weeks.

The birds in the pen made larger increases on less food than those in the crates, and consequently the cost of production per pound of increase with the former is less than with the latter—the difference in favour of the pen being no less than 1·2 cents per pound of live weight.

TABLE VII.—PEN *versus* CRATE.

No. 7.—Silver-Gray Dorking. No. 8.—Barred Plymouth Rock.

			Number of chicken.		Pullet or Cockerel.		WEIGHT.																Gain during experiment.		Average gain per chicken per week.	
							Beginning of Experiment.		1st week.		2nd week.		3rd week.		4th week.		5th week.		6th week.							
No. 7.			Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.		
Pen.....	71	P.	1	11 $\frac{1}{2}$	2	3	2	7	2	15 $\frac{1}{2}$	3	4	.....	.....	.....	.....	.....	.....	1	8 $\frac{1}{2}$	0	6 $\frac{1}{2}$
".....	73	P.	1	8 $\frac{1}{2}$	2	0	2	4	2	10	2	14	.....	.....	.....	.....	.....	.....	1	6	0	5 $\frac{1}{2}$
".....	74	P.	1	14	2	5 $\frac{1}{2}$	2	10	3	1	3	5 $\frac{1}{2}$	.....	.....	.....	.....	.....	.....	1	7 $\frac{1}{2}$	0	6
".....	77	P.	1	12	2	3 $\frac{1}{2}$	2	7 $\frac{1}{2}$	2	13	3	1 $\frac{1}{2}$	.....	.....	.....	.....	.....	.....	1	5 $\frac{1}{2}$	0	5 $\frac{1}{2}$
".....	78	P.	2	1 $\frac{1}{2}$	2	7 $\frac{1}{2}$	2	11	3	1 $\frac{1}{2}$	3	6	.....	.....	.....	.....	.....	.....	1	6	0	5 $\frac{1}{2}$
".....	81	P.	1	14 $\frac{1}{2}$	2	8	3	12	3	4	3	8	.....	.....	.....	.....	.....	.....	1	10	0	6 $\frac{1}{2}$
Crate.....	70	P.	1	6	1	15	2	4	2	11	2	13 $\frac{1}{2}$	.....	.....	.....	.....	.....	.....	1	7 $\frac{1}{2}$	0	6
".....	72	P.	1	10 $\frac{1}{2}$	2	2	2	8	2	11 $\frac{1}{2}$	2	15 $\frac{1}{2}$	.....	.....	.....	.....	.....	.....	1	5	0	5 $\frac{1}{2}$
".....	75	P.	1	4 $\frac{1}{2}$	1	11 $\frac{1}{2}$	1	15	2	4 $\frac{1}{2}$	2	10	.....	.....	.....	.....	.....	.....	1	5 $\frac{1}{2}$	0	5 $\frac{1}{2}$
".....	76	P.	1	7	1	15	2	4 $\frac{1}{2}$	2	11 $\frac{1}{2}$	2	13	.....	.....	.....	.....	.....	.....	1	6	0	5 $\frac{1}{2}$
".....	79	P.	1	9	2	3	2	6 $\frac{1}{2}$	2	12	3	1	.....	.....	.....	.....	.....	.....	1	8	0	6
".....	80	P.	1	13	2	4 $\frac{1}{2}$	2	8	2	12	2	15	.....	.....	.....	.....	.....	.....	1	2	0	4 $\frac{1}{2}$
No. 8.																										
Pen.....	89	C.	3	11 $\frac{1}{2}$	4	12 $\frac{1}{2}$	5	6	5	10 $\frac{1}{2}$	6	8	6	13	7	1 $\frac{1}{2}$	3	5	0	8 $\frac{1}{2}$						
".....	96	C.	3	5 $\frac{1}{2}$	4	6 $\frac{1}{2}$	4	15	5	4	5	10	5	11	6	2 $\frac{1}{2}$	2	13	0	7 $\frac{1}{2}$						
".....	27	C.	3	2	3	14	4	9 $\frac{1}{2}$	5	0	5	5 $\frac{1}{2}$	5	10 $\frac{1}{2}$	5	14	2	12	0	7 $\frac{1}{2}$						
".....	81	C.	3	12	4	13 $\frac{1}{2}$	5	7 $\frac{1}{2}$	5	9	6	4 $\frac{1}{2}$	6	12	6	9	2	13	0	7 $\frac{1}{2}$						
".....	25	C.	3	3	4	3	5	0	5	6 $\frac{1}{2}$	5	15	5	15	6	8	3	5	0	8 $\frac{1}{2}$						
".....	82	C.	2	15	3	12	4	8	4	14	5	6	5	13	6	6	3	7	0	9 $\frac{1}{2}$						
Crate.....	23	C.	3	7	4	1 $\frac{1}{2}$	4	3	4	8	4	15	4	8	5	2	1	11	0	4 $\frac{1}{2}$						
".....	45	C.	3	9 $\frac{1}{2}$	4	8	4	14 $\frac{1}{2}$	5	2	5	11 $\frac{1}{2}$	5	15 $\frac{1}{2}$	5	10	2	1 $\frac{1}{2}$	0	5 $\frac{1}{2}$						
".....	42	C.	3	15 $\frac{1}{2}$	4	12 $\frac{1}{2}$	5	10	5	15	6	9	7	2	7	8	3	8 $\frac{1}{2}$	0	9 $\frac{1}{2}$						
".....	92	C.	3	15 $\frac{1}{2}$	4	10 $\frac{1}{2}$	5	0	5	6 $\frac{1}{2}$	5	7 $\frac{1}{2}$	6	2	6	4	2	4 $\frac{1}{2}$	0	6 $\frac{1}{2}$						
".....	84	C.	3	6	4	4	4	6 $\frac{1}{2}$	4	14 $\frac{1}{2}$	5	9	6	0	6	7 $\frac{1}{2}$	3	1 $\frac{1}{2}$	0	8 $\frac{1}{2}$						
".....	52	C.	3	1 $\frac{1}{2}$	3	8	4	3	4	3 $\frac{1}{2}$	4	9	4	15	5	0	1	15 $\frac{1}{2}$	0	5 $\frac{1}{2}$						

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TABLE VIII.—PEN *versus* CRATE.

No. 7—Silver-Gray Dorking.

No. 8—Barred Plymouth Rock,

—	NUMBER OF CHICKENS.		Weight at beginning of experiment.		Weight at close of experiment.		Total increase in weight.		Average increase in weight per chicken.		FOOD CONSUMED.				Total cost of food.		Cost of food per lb., in- crease in live weight.
	Pullets.	Cockerels.									Meal.		Skim-milk.				
No. 7.			Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	\$	cts.	Cts.
Pen.....	6	.....	10	2½	19	8	9	5½	1	9	19	13½	34	..	0	31	3·3
Crate ..	6	.....	9	2	17	4	8	2	1	6	24	4	36	..	0	37	4·5
No. 8.																	
Pen.....	.....	6	20	1	38	8	18	7	3	1½	74	8	61	..	1	06	5·7
Crate.....	.....	6	21	6	35	15½	14	9½	2	7	69	6	61	..	1	00	6·8

Barred Plymouth Rock.—Commenced October 19, age of chickens (all cockerels) three months. Experiment continued for six weeks.

The six chickens in the crates, though weighing 1 lb. 5 oz. more at the beginning of the experiment than the six fed in the pen, weighed 2 lb. 8½ oz. less than the latter birds at the end of the feeding period, six weeks. In other words, the birds in the pen made an aggregate gain of 3 lbs. 13½ oz. more than the crate birds.

Dividing the total increase in weight into the cost of the food consumed, we find in the case of the pen-fed birds 5·7 cents as the cost per pound of increase, while for the crate-fed birds this cost was 6·8 cents.

Both tests, it will be observed, have from the standpoint of economical feeding, given marked results in favour of pen fattening.

PROPORTION of Edible and Non-edible parts, calculated on weight of chickens as killed.

—	Edible.		Non-edible.		
	Dressed carcase.	Giblets.	Head and feet.	Feathers.	Entrails, contents of gizzard, &c.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Pen	68·0	4·5	10·8	9·0	7·7
Crate.....	68·4	4·5	11·0	8·9	7·2

All the birds were excellent table fowl, but the pen-fed presented the finer appearance as to colour and size. Though it was difficult for some of those who tested the dressed meat to note any difference as regards juiciness, the majority considered the pen-fed fowl as the better in this respect.

RATIONS WITH GLUTEN MEAL AND CLOVER MEAL.

To obtain some information as to the suitability of gluten meal and clover meal as part of the ration, for fattening poultry, we compounded two rations: No. 1 containing the former, and No. 2 the latter, maintaining the same protein ratio as in the ration used in the tests 'skim-milk *versus* water', 'whole *versus* finely ground grain', and 'pen *versus* crate'.

They were as follows :—

No. 1.	No. 2.
Ground oats.....3 parts.	Ground oats.....5 parts.
Gluten meal.....1 part.	Ground clover.....5 "
	Meat meal..... $\frac{3}{4}$ part.

Both were fed mixed with skim-milk.

The experiments were made at the same time with Barred Plymouth Rock cockerels of the same age (about 12 weeks), six being put on each ration. The pens with yards attached were used and the feeding continued for six weeks.

TABLE IX.—GLUTEN MEAL AND CLOVER MEAL WITH BARRED PLYMOUTH ROCK.

Ration.	Pullet or Cockerel.	WEIGHT.												Gain in six weeks.	Average gain per chicken per week.				
		Beginning of experi- ment.		1st week.	2nd week.	3rd week.	4th week.	5th week.	6th week.										
		Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.						
No. 1.—Gluten Meal Ration.....	C	2	8	2	14	2	15	3	13½	4	10	5	6	5	9	3	1	0	8¼
" " " " " " " " " " " "	C	3	6	4	5	4	13½	5	2	5	13½	6	5½	6	13	3	7	0	9¼
" " " " " " " " " " " "	C	2	9½	3	½	3	3½	3	7	3	10	3	15	4	4½	1	11	0	4½
" " " " " " " " " " " "	C	2	14½	3	5	3	7½	3	14½	4	3½	4	9½	5	1	2	2½	0	5¾
" " " " " " " " " " " "	C	3	11	4	7½	4	14	5	3	5	3	5	12	6	1	2	6	0	6½
" " " " " " " " " " " "	C	2	2	2	13	3	6	3	11	4	4½	4	11½	5	0	2	14	0	7½
No. 2.—Clover Meal Ration.....	C	3	10	4	5	4	10	5	3½	5	8½	5	14	5	15	2	5	0	6½
" " " " " " " " " " " "	C	4	0	5	2	5	10	5	15	6	12	6	12½	7	2	3	2	0	8½
" " " " " " " " " " " "	C	2	4½	3	1½	3	6	3	14½	4	5½	4	9	4	13	2	8½	0	6½
" " " " " " " " " " " "	C	3	2¾	3	14	4	4½	4	6	4	13	4	6½	4	14	1	11½	0	4¾
" " " " " " " " " " " "	C	2	8¾	3	6	3	13	4	4½	4	5	4	10	5	2	2	9½	0	7½
" " " " " " " " " " " "	C	2	14	3	½	3	3½	3	7½	3	8	3	10	3	12	0	14	0	2½

Ration No. 1.—(with gluten meal), valued at 1·3 cents per pound. All the chickens on this feed did remarkably well, eating heartily but not abnormally. They were healthy and lively throughout the feeding period.

Ration No. 2.—(with clover meal), valued at 1·1 cents per pound. These birds ate nearly 19 lbs. more meal and 30 lbs. more skim-milk than those on ration No. 1, their appetite apparently being abnormal. They did not exhibit the same healthy appearance during the test as those on the gluten meal ration. From the large amount of excrement produced it seemed evident that a considerable portion of the food was not digested.

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TABLE X.—GLUTEN MEAL AND CLOVER MEAL.

	No. of CHICKENS.		Weight at beginning of experiment.	Weight at close of experiment.	Total increase in weight.	Average increase in weight per chicken	Food CON-SUMED.		Total cost of food.	Cost of food per lb. of increase in live weight.
	Pullets.	Cockerels.					Meal.	Skim-milk.		
			Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs.	Cts.	Cts.
Ration 1— (Gluten).....		6	17 3	32 12	15 9	2 9	51 0	40	72	4·6
Ration 2— (Clover).....		6	18 7½	31 10	13 2½	2 3	69 10	70	87	6·6

Though ration No. 2 (clover) cost considerably less than ration No. 1 (gluten), the increase in live weight by its use cost 2 cents per pound more than that by No. 1. All the results tend to show that clover meal, at all events in the proportion here used, cannot be economically employed in the fattening ration.

Our work has shown that the age at which the chicken is fattened essentially affects the price per lb. of increase. After a certain age and size have been reached, probably varying somewhat with the breed, this cost increases. To make a strict comparison between rations, therefore, chickens of a like age must be used. We cannot consequently strictly compare the results of this experiment with those of the breed test as to economy in fattening, since the birds in that series (in which Plymouth Rocks made an increase at 3·8 cents and 4 cents per lb.) were one month younger. But the chickens of the ‘Whole *versus* Finely ground Grain’ were of the same age and breed, and the test simultaneously made with the one under discussion and therefore we can fairly compare them. We find in the ‘Finely ground Grain’ lot the increase cost 5·6 cents per lb. 1 cent per lb. more than with the ration containing gluten meal.

The birds from both tests were killed and dressed, giving data as follows :—

PROPORTION of Edible and Non-edible parts, calculated on weight of chickens as killed.

RATION.	EDIBLE.		NON-EDIBLE.		
	Dressed carcass.	Giblets.	Head and feet.	Feathers.	Entrails, contents of gizzard, &c.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
No. 1 (Gluten).....	66·4	5·4	11·6	8·1	8·5
No. 2 (Clover).....	63·5	6·0	11·4	8·3	10·8

These results are distinctly in favour of Ration No. 1. (gluten) there being almost 3 per cent more dressed carcass than with Ration No. 2. (clover). Further, the gluten meal birds were better filled out, of better colour, and altogether of finer appearance than those on the ration containing clover meal, their meat was considered juicier and more delicate eating.

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In conclusion we may say that this ration No. 1 has given such satisfactory results from every standpoint that it merits further investigation. Gluten meal has shown itself with other classes of farm stock an easily digested, concentrated food of great value, and we are encouraged in further work with poultry to experiment with it in varying proportions with other meals. The indications are that it will prove a profitable flesh producing food in chicken fattening.

My thanks are due to Mr. H. W. Charlton second assistant chemist for his painstaking work in carrying out the details of this investigation.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES.

REPORT OF R. ROBERTSON, SUPERINTENDENT.

NAPPAN, N.S., November 30, 1902.

To DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith my annual report of operations on the Experimental Farm for the maritime provinces at Nappan N.S.

The season has been backward and cool generally. The Indian corn crop was much below the average and did not mature well. The hay crop on the marsh was light, while the upland gave a fair yield. The grain crop was exceptionally good, and the root crop was also larger than usual. The catch of clover was exceptionally fine, and the after grass good.

More than the usual number of people visited the farm this season. These were mostly parties and excursions from surrounding sections and adjoining counties. The number would have been greatly increased, if more satisfactory railway arrangements could have been made by those living at a distance.

I again wish to acknowledge the valuable services of Mr. Thomas Coates, farm foreman, who has kept the records of all the grain experiments, and has taken charge of general farm work, and of Mr. Robert Donaldson, herdsman, under whose care all the experiments with stock have been carried on.

WEATHER.

December opened cold, with some snow, but not enough fell for sleighing until the 4th. The thermometer went down to 5° above zero on the 6th. Moderate weather for a few days was followed by cold. On the 17th and 21st there were further snow-falls. On the 23rd the thermometer registered 7° below zero, when the weather quickly moderated and all the snow disappeared. Unsteady weather, without snow, continued to the end of the month.

January commenced very cold, and continued more or less so until the 9th and 10th, when a snow storm with high winds blocked the roads in many places. Good sleighing continued until the 22nd, when mild weather, with rain, put an end to it. Sleighs did not run again until February 5. The thermometer was down to zero on January 15 and 18 and 6° below zero on January 21. February commenced cold, the temperature falling to 3° below zero. The weather kept fairly cold with small snow storms making good sleighing by the 8th, which continued to March 1. The thermometer registered 10° below zero on the 12th, 4° below zero on the 16th and zero on the 17th.

The thermometer only registered below zero once in March and that was on the 9th when 2° below zero was reached. The month generally, was moderate. Sleighing kept good until the 12th. The remainder of the month was quite open.

April was a fine open month, with no very cold weather. The thermometer fell below freezing only from the 5th to the 8th, 17th to 20th and the 26th. The month generally was quite dry but gloomy. The first seeding was done April 24th.

May opened cloudy and cool with rain on the 8th, 9th and 10th. The 12th registered 4°; 14th, 3°; 15th, 4°; 16th, 2°; 19th, 8° and 21st 6° of frost. Up to this time the weather was fine and dry. The remainder of May was showery but much warmer.

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The thermometer fell to freezing on June 7, and we had some very wet, cool weather on the 3rd and 4th. After this June was showery with no very heavy rains until the 23rd and 27th. Generally the month was much cooler and more cloudy than usual. The thermometer only passed above 70° on the 10th, 14th, 15th and 17th.

July opened fine but cool, with heavy rains on the 4th and 9th. After the middle of the month it was warmer but showery to the end. On the whole this month was much cooler than usual. The thermometer registered 80° on the 15th; 81° on the 29th and 83° on the 31st and at no other time in the month was the 80° mark reached.

Heavy rains occurred on August 5, 7, 14 and 18. The weather was warmer, but not up to the average and no extremes of heat were reached. The thermometer registered as the highest 80° on the 1st; 80° on the 30th and 81° on the 31st.

September was a fine month throughout and gave a good opportunity for harvesting. The first and only frost in this month (three degrees) was on the 26th.

October was also fine to the middle of the month, after which it was more or less broken with quite heavy frosts.

November was exceptionally fine and warm, giving a good chance to complete the fall work. There were no heavy frosts this month.

METEOROLOGICAL RECORD.

Maximum and minimum thermometrical observations for the year beginning December 1, 1901, and ending November 30, 1902.

Month.	Maximum.	Minimum.
1901.		
December	14th 52° above zero.....	23rd 7° below zero.
1902.		
January.....	23rd 52° above zero.....	21st 6° below zero.
February.....	26th 45° "	12th 10° "
March.....	17th 55° "	9th 2° "
April.....	30th 73° "	7th 22° above zero.
May.....	26th 72° "	19th 23° "
June.....	2nd 77° "	7th 31° "
July.....	31st 83° "	11th 43° "
August.....	31st 81° "	29th 43° "
September.....	1st 77° "	26th 28° "
October.....	28th 66° "	18th 20° "
November.....	5th 58° "	9th 19° "

EXPERIMENTS WITH OATS.

The soil selected for the oat plots was a clay loam, in a good state of cultivation. The previous crop was mangels for which crop 20 one-horse cart loads of stable manure per acre were used. The land was ploughed in the fall after the root crop was removed. In the spring the ground was harrowed twice with the spring tooth and once with the smoothing harrow. No fertilizer was used.

Sixty-five varieties were included in the test. These were sown in one-fortieth-acre plots on April 30 at the rate of 2½ bus. per acre with the seed drill. The ground was seeded down with timothy and clover, 3 lbs. of alsike, 7 lbs. of Mammoth Red, and 12 lbs. of timothy seed per acre, being sown with an attachment to the seeder at the same time as the grain was sown. The crop of straw was very heavy and in some places lodged. The grain filled out well. Smut was occasionally noticed in a great number of the plots. The straw was quite free from rust. The results given in the test were as follows:—

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OATS—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.
			In.		In.		Lbs.	Bush.	Lbs.
Golden Tartarian	Sept. 8..	131	54	Stiff..	7 to 9	Sided..	6,600	111	26
Golden Giant.	" 5..	128	54	"	8 "10	"	7,600	108	8
Salines.	Aug. 26.	118	54	"	6 " 9	Branching..	7,400	107	2
Cromwell.	Sept. 1..	124	54	"	7 "10	Half Sided..	6,920	105	30
White Schonen.	Aug. 26..	118	50	"	7 " 8	Branching	5,800	105	30
White Giant.	" 30..	123	53	"	6 " 8	"	5,800	104	24
New Zealand.	Sept. 8..	131	54	"	7 "10	Sided.	7,200	103	18
American Beauty.	" 2..	125	52	"	6 " 8	Branching..	6,800	102	12
Siberian.	" 1..	124	52	"	6 " 8	"	7,600	102	12
Lincoln.	" 2..	125	54	"	6 " 8	"	7,000	102	12
Early Golden Prolific	" 2..	125	52	"	6 " 8	"	6,920	102	12
Mennonite.	Aug. 31..	123	50	Medium..	6 " 8	"	6,920	102	12
Early Maine.	" 31..	123	50	"	6 " 8	"	7,400	101	6
Abyssinia.	" 29..	121	52	Stiff.	7 " 9	Half Sided..	7,800	101	6
Bavarian.	" 28..	120	47	"	6 " 8	Branching..	6,800	100	..
Goldfinder.	Sept. 1..	124	52	"	6 " 8	"	7,000	100	..
Newmarket	Aug. 26..	118	54	"	8 "10	"	6,200	100	..
Sensation	" 28..	120	48	Medium..	7 " 8	"	6,200	100	..
Improved Ligowo.	" 28..	120	49	"	6 " 8	"	6,400	97	22
Columbus	Sept. 3..	126	50	"	6 " 8	"	6,400	97	22
Holstein Prolific.	Aug. 31..	123	50	"	6 " 8	"	7,400	97	22
Tartar King.	" 27..	119	48	Stiff.	6 " 8	Sided.	7,000	97	22
Danish Island	Sept. 1..	124	48	"	6 " 8	Branching..	6,200	97	22
Salzer's Big 4.	Aug. 28..	120	48	Medium..	6 " 8	"	7,200	97	22
Early Blossom.	" 28..	120	48	Stiff.	7 " 8	Half Sided..	7,200	96	16
Pioneer.	" 26..	118	46	"	6 " 8	Branching..	5,880	95	10
Thousand Dollar.	" 28..	120	48	Medium..	6 " 8	"	6,400	95	10
Black Tartarian.	Aug. 31..	123	54	Stiff.	7 " 9	Sided.	6,600	95	10
American Triumph.	Sept. 5..	128	56	"	7 "10	Branching..	6,600	93	28
Wallis.	Aug. 30..	122	50	Medium..	6 " 8	"	6,600	93	28
Buckbee's Illinois.	" 28..	120	50	Stiff..	6 " 8	"	6,600	92	32
Golden Beauty.	Sept. 1..	124	52	Medium..	6 " 9	"	6,400	91	26
Oderbruch.	Aug. 28..	120	48	Stiff.	6 " 8	Half Sided..	7,080	91	26
20th Century	" 26..	118	48	"	8 " 9	Branching..	6,520	91	26
Banner.	" 24..	116	47	"	8 " 9	"	6,400	90	20
Miller	Sept. 3..	126	56	"	7 " 9	"	7,200	90	20
Abundance.	Aug. 25..	117	46	"	8 " 9	"	7,200	89	14
White Russian.	" 26..	118	52	Medium..	6 " 8	"	6,320	89	14
Russell	" 30..	122	52	"	7 " 9	"	6,800	88	8
Flying Scotchman.	Aug. 24..	116	44	Weak.	6 " 8	"	7,000	88	8
Rosedale.	" 26..	118	50	Stiff.	7 " 9	Sided.	6,280	88	8
Oxford.	" 30..	122	52	Medium..	6 " 8	Branching..	6,600	87	2
Bonanza.	" 31..	123	54	Stiff.	6 " 9	"	8,000	87	2
Black Beauty.	" 21..	113	48	Medium..	6 " 8	"	6,800	87	2
Joanette.	" 28..	120	46	Stiff.	5 " 8	"	6,000	87	2
Olive.	" 28..	120	52	"	7 " 9	Sided.	6,200	85	30
Pense.	" 28..	120	52	"	7 " 9	"	6,600	85	30
Wide Awake	" 30..	122	50	"	6 " 8	Branching..	7,200	85	30
California Prolific Black.	" 30..	122	54	"	7 " 9	Sided.	6,800	85	30
Scotch Potato.	" 30..	122	48	"	5 " 7	Branching..	6,400	85	30
Cream Egyptain	" 26..	118	50	"	6 " 8	Sided.	6,600	84	24
Hazlett's Seizure.	" 26..	118	48	Medium..	7 " 8	Branching..	6,000	83	18
Milford	" 28..	120	50	Stiff.	8 "10	Sided.	6,280	83	18
Irish Victor	" 28..	120	52	"	7 " 9	Branching..	5,400	83	18
Improved American.	" 30..	122	54	"	7 " 8	"	5,800	82	12
King.	Sept. 2..	125	56	"	7 " 9	"	6,680	82	12
Holland.	" 1..	124	56	"	6 " 9	"	6,000	82	12
Black Mesdag	Aug. 16..	108	50	Medium..	7 " 9	"	6,920	82	12
Early Gothland.	" 26..	118	48	Stiff.	7 " 8	Sided.	6,000	82	12
Kendal	" 30..	122	50	"	7 " 9	"	6,200	80	..
Master	" 30..	122	50	"	7 " 9	Branching..	7,000	75	10
Brandon.	" 31..	123	56	Medium..	6 " 8	"	7,200	74	4
Longhoughton.	" 31..	123	48	"	5 " 7	"	7,200	72	32
Early Archangel	" 26..	118	5	"	7 " 8	"	6,000	71	26
Waverley.	" 28..	123	3	"	7 " 9	"	6,280	71	20

EXPERIMENTS WITH BARLEY.

Twenty-one varieties of two-rowed and thirty of six-rowed barley were sown May 16 in plots of one-fortieth acre each. The seed was sown with the seed-drill, at the rate of 2 bushels per acre. Timothy and clover seed was sown at the same time at the rate of 3 lbs. Alsike, 7 lbs. Mammoth Red, and 12 lbs. of Timothy per acre. No fertilizer was used with these plots.

BARLEY, TWO-ROWED—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			Inches.		Inches.	Lbs.	Bush.	Lbs.	Lbs.
Danish Chevalier.....	Aug. 29..	105	42	Stiff.....	3 to 4	6,000	60	40	50
Canadian Thorpe.....	" 26..	102	46	"	2 " 3	4,800	50	40	52
Newton	" 27..	103	42	"	2 " 3	4,400	50		50
French Chevalier	" 29..	105	42	Medium.....	2½ " 3½	4,200	49	8	51
Standwell	" 30..	106	42	"	2 " 3	4,680	47	24	50
Victor.....	" 27..	103	43	"	2 " 3	5,400	47	24	49½
Sidney.....	" 26..	102	45	"	2 " 3½	5,000	45	40	50½
Hervey.....	" 26..	102	46	Stiff.....	2 " 3	4,800	45		49½
Clifford	" 27..	103	46	"	3 " 3½	4,680	44	8	50
Kinver Chevalier.....	" 29..	105	42	Weak	3 " 4	4,600	44	8	48½
Beaver.....	" 27..	103	42	Stiff....	3 " 4	3,800	43	16	50
Nepean	" 26..	102	43	"	3 " 4	4,400	43	16	50
Logan.....	" 27..	103	45	"	2 " 3	4,800	42	24	48
Gordon.....	" 26..	102	45	"	2 " 3	4,480	40	40	49
Jarvis.....	" 27..	103	44	"	3 " 4	4,800	40		48
Dunham.....	" 26..	102	44	"	2½ " 3	4,400	40		50
Invincible.....	" 27..	103	42	"	2 " 3	3,600	39	8	49
Prize Prolific.....	" 27..	103	42	Medium.....	2½ " 3	3,800	38	16	49
Bolton.....	" 27..	103	41	Stiff....	3 " 4	3,600	37	24	50
Fulton.....	" 27..	103	43	"	2 " 3	3,600	37	24	49
Leslie ..	" 26..	102	42	"	2 " 3	3,400	33	16	49

BARLEY, SIX-ROWED—TEST OF VARIETIES.

Common.....	Aug. 22..	93	44	Medium....	2 to 3	5,200	63	16	48
Royal	" 23..	99	45	"	2 " 3	5,800	59	8	46
Garfield	" 22..	98	45	"	2½ " 3	5,000	58	16	48
Stella.....	" 28..	104	43	Stiff.....	2 " 2½	5,120	58	16	48
Mansfield	" 25..	101	45	"	2 " 3	4,600	56	32	48
Empire.....	" 27..	103	45	Medium....	2 " 2½	5,600	55		46
Trooper	" 23..	99	46	Stiff.....	2 " 3	5,600	54	8	47
Surprise.....	" 28..	104	45	"	2 " 2½	5,400	53	16	49
Baxter	" 22..	98	43	"	2 " 3	5,600	53	16	48
Nugent	" 28..	104	43	"	2 " 2½	4,600	52	24	47
Oderbruch.....	" 22..	98	43	Medium....	2 " 3	4,400	52	24	48½
Argyle.....	" 22..	98	42	Stiff.....	2 " 3	3,800	52	24	48
Yale	" 25..	101	43	"	2 " 3	3,880	52	24	47
Odessa.....	" 22..	98	42	Medium....	2 " 3	4,200	51	32	48
Excelsior.....	" 20..	96	46	"	3 " 4	5,000	51	32	40
Rennie's Improved.....	" 23..	99	44	Stiff.....	2 " 3	3,800	51	32	49
Mensury.....	" 27..	103	45	"	2 " 3	4,400	50		48
Vanguard	" 23..	99	42	Stiff.....	2 " 3	3,800	50		47½
Brome.....	" 27..	103	42	Medium....	2 " 3	5,400	50		47
Claude	" 27..	103	45	"	2 " 3	5,400	49	8	47
Success.....	" 20..	96	44	"	2½ " 3	4,400	49	8	49
Hulless Black.....	" 20..	96	34	"	" 2	3,600	48	16	61
Albert.....	" 22..	98	44	Stiff.....	2 " 3	3,600	47	24	49
Champion	" 20..	96	44	Medium....	2 " 3½	4,600	45	40	39
Pioneer	" 25..	101	42	"	2 " 3	4,800	44	8	49
Hulless White	" 20..	96	35	"	" 2	3,600	44	8	60
Summit.....	" 28..	104	43	Stiff.....	2 " 2½	4,800	43	16	48
Petschora.....	" 23..	99	42	Medium....	2 " 3	4,600	42	24	48
Blue Long Head.....	" 27..	103	42	"	2 " 2½	4,600	40		45
Phoenix.....	" 25..	101	40	"	2 " 3	4,680	39	8	48

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The land was a clay loam, and was previously in corn, for which crop 20 one-horse cart loads of manure were used per acre. The land was ploughed in the fall, and in the spring was gone over twice with the spring-tooth, and once with the smoothing harrow, before seeding. The straw was not much lodged and the grain filled well. Very little smut was noticed, and the straw was quite free from rust.

EXPERIMENTS WITH SPRING WHEAT.

The wheat plots each of one-fortieth acre were sown April 26. The land was previously in mangels and received for that crop 20 one-horse cart loads of manure per acre. The soil was a clay loam ploughed in the fall and was in a good state of fertility. Seventy-two varieties were included in the test. The ground was cultivated twice with the spring-tooth and once with the smoothing harrow, and the seed sown at the rate of $1\frac{3}{4}$ bushels per acre. At the same time 3 lbs. of Alsike, 7 lbs. of Mammoth Red Clover and 12 lbs. Timothy seed were sown per acre. The grain made splendid growth and filled out well. The straw was stiff, but a heavy wind and rain storm lodged small portions of it. The straw was quite free from rust and no smut was noticed.

SPRING WHEAT—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.
			In.		In.		Lbs.	Bush. lbs.	Lbs.
Japanese.....	Sept. 1..	128	46	Medium..	2 to 3	Bearded....	6,680	55 20	60
Norval.....	" 1..	128	47	" ..	2 " 3	"	6,720	55 20	61
Vernon.....	" 1..	128	46	" ..	2 " 3	"	6,400	54 40	60
Plumper.....	" 1..	128	46	" ..	2 " 3	"	6,400	54 ..	61
Rio Grande... ..	" 1..	128	54	Stiff.....	3 " 4	"	7,000	52 20	62
Hungarian.....	" 1..	128	48	Medium..	2 " 3	"	6,800	52 ..	60
Crown.....	" 1..	128	53	Stiff.....	2 " 3	"	6,780	51 20	60
Huron.....	Aug. 31..	127	50	Medium ..	3 " 4	"	7,200	50 40	60
Beaudry.....	Sept. 1..	128	48	" ..	2 " 3	"	7,000	50 ..	60½
Benton.....	Aug. 31..	127	46	Stiff.....	2 " 3½	Beardless ..	5,800	50 ..	60
Advance.....	Sept. 1..	128	48	" ..	2 " 3	Bearded....	6,800	49 20	60
Dufferin.....	" 1..	128	52	" ..	2 " 3½	"	6,520	49 20	59
Colorado.....	Aug. 31..	127	47	Medium..	2 " 3	"	6,400	49 20	60½
Roumanian.....	Sept. 1..	128	52	" ..	2 " 3	"	7,000	48 40	60
Red Fife.....	" 1..	128	48	Stiff.....	2 " 4	Beardless....	7,200	48 40	60
Red Fern.....	" 1..	128	52	" ..	3 " 4	Bearded....	7,200	48 40	61
Alpha.....	" 1..	128	52	" ..	2 " 3	"	6,600	48 40	60
Early Riga.....	Aug. 28..	124	48	" ..	2 " 3	Beardless. .	7,000	48 ..	60½
Cartier.....	Sept. 1..	128	48	" ..	2 " 2½	Bearded....	5,400	48 ..	61
Preston.....	Aug. 31..	127	48	" ..	3 " 4	"	6,600	47 20	61
Clyde.....	Sept. 1..	128	50	" ..	3 " 4	Beardless....	6,200	47 20	60
Captor.....	" 1..	128	48	" ..	2 " 3	"	6,280	47 20	60
Wellman's Fife.....	" 4..	131	48	" ..	3 " 4	"	6,400	46 40	60
Byron.....	" 1..	128	46	Weak.....	2 " 3	"	5,800	46 40	60
Australian, No. 13...	" 4..	131	48	Stiff.....	2 " 3	"	7,200	46 40	60
Australian, No. 27.....	" 4..	131	48	" ..	3 " 4	"	7,400	46 40	60
Crawford.....	" 1..	128	52	" ..	2 " 3	"	6,400	46 40	60
White Fife.....	" 4..	131	48	" ..	2½ " 4	"	6,400	46 ..	60½
Countess.....	" 1..	128	52	" ..	2 " 3	"	6,000	45 20	59
Goose.....	Aug. 31..	127	46	Medium ..	2 " 3	Bearded....	6,000	45 20	62
White Russian.....	Sept. 4..	131	48	Stiff.....	3 " 4	Beardless....	5,520	44 ..	60
Angus.....	Aug. 31..	127	47	" ..	2 " 3	"	5,000	44 ..	60
Laurel.....	Sept. 4..	131	54	" ..	3 " 4	"	5,120	43 20	59½
Speltz.....	Aug. 31..	127	44	Weak.....	2 " 2½	Bearded....	6,000	43 20	40

SPRING WHEAT—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.
			In.		In.		Lbs.	Bush. lbs.	Lbs.
Campbell's White Chaff ..	Sept. 4..	131	46	Stiff ..	2 " 3	Beardless...	6,000	43 20	61
Percy	Aug. 31..	127	48	"	3 " 4	"	6,000	43 20	60 $\frac{1}{2}$
Mason	Sept. 1..	128	46	"	2 " 3	"	6,400	42 40	59 $\frac{1}{2}$
Blenheim.....	" 1..	128	48	"	2 $\frac{1}{2}$ " 3 $\frac{1}{2}$	Bearded...	6,200	42 40	60
Monarch	" 4..	131	46	"	2 " 3 $\frac{1}{2}$	Beardless...	5,600	42 ..	60
Australian, No. 10.....	" 4 .	131	46	"	2 " 3	"	6,920	42 ..	60
Beauty	" 1..	128	50	"	2 $\frac{1}{2}$ " 4	"	5,800	42 ..	60
Ladoga.....	Aug. 28..	124	46	"	2 " 3	Bearded....	6,600	42 ..	59
Robin's Rust Proof..	Sept. 4..	131	46	Medium..	2 " 3	Beardless...	7,200	42 ..	61
Hastings.	" 1..	128	48	"	2 " 3	"	6,000	41 20	60
Australian, No. 25.....	" 4..	131	48	Stiff.,....	3 " 4	"	7,400	41 20	60
Progress	" 4..	131	52	"	2 " 3	"	5,800	41 20	59
Ebert	" 1..	128	46	"	2 " 3	"	5,360	40 40	60
Stanley	" 3..	130	50	"	2 " 3	"	6,000	40 40	60
Bishop.....	Aug. 31..	127	47	"	2 " 3	"	5,400	40 40	60
White Connell.....	Sept. 4..	131	48	"	2 " 3	"	4,800	40 40	60
Weldon	" 4..	131	51	"	2 " 3	"	5,800	40 ..	60 $\frac{1}{2}$
Dion's.....	" 1..	128	50	Medium..	2 " 3	Bearded....	6,400	40 ..	59
Red Swedish	" 4..	131	50	"	3 " 4	"	5,600	40 ..	60
Australian, No. 23.....	" 4..	131	48	Stiff.....	3 " 4	Beardless...	7,200	40 ..	60
Green Mountain.....	" 4.	131	48	"	2 " 3	Bearded....	5,200	40 ..	60
Pringle's Champlain.	Aug. 31..	127	46	"	2 $\frac{1}{2}$ " 4	"	5,480	40 ..	60
Herisson Bearded.....	Sept. 4..	131	48	Weak	2 " 2 $\frac{1}{2}$	"	5,200	39 20	60
Minnesota, No. 149.....	" 4..	131	48	Stiff.....	2 " 3	Beardless...	5,600	38 40	60
Minnesota, No. 163.....	" 4..	131	48	"	2 " 3	"	5,400	38 ..	60
Essex	" 1 .	128	54	"	3 " 4	"	7,080	38 ..	60
Harold.....	Aug. 31..	127	46	Medium..	2 " 3	Bearded....	5,400	38 ..	59
Australian, No. 9.....	Sept. 4..	131	48	Stiff.....	2 " 3	Beardless...	6,440	38 ..	60
Australian, No. 19.....	" 4..	131	47	"	2 " 3	"	6,000	38 ..	60
Rideau	" 1..	128	44	"	2 " 3	"	5,800	37 20	59
Dawn	" 1..	123	52	"	2 " 3	"	5,800	37 20	59
Admiral.....	" 1..	128	48	"	3 " 4	"	5,800	37 20	60
Minnesota, No. 181.....	" 4..	131	50	"	2 " 3	"	4,800	36 40	60
Chester	Aug. 31 .	127	48	"	2 " 3	"	4,800	36 40	60
Fraser.....	Sept. 4..	131	46	"	2 " 3	Bearded....	6,000	35 20	59
Blair	" 2..	129	46	"	2 " 3	"	6,400	35 20	60
Minnesota, No. 169.....	" 4..	131	50	"	2 " 3	Beardless...	5,200	35 20	60
Cassel	Aug. 31..	127	46	"	2 " 3	"	5,600	35 20	59

EXPERIMENTS WITH PEASE.

The pease were grown on a land of a light clay loam character. The previous crop was mixed grain. This land has never had any barn-yard manure, but marsh mud at the rate of 60 two-horse loads per acre was used previous to the sowing of the mixed grain crop in 1901. The ground was ploughed in the autumn and in the spring was worked up with the disc, spring-tooth and smoothing harrows. Complete Fertilizer at the rate of 200 lbs. per acre was drilled in with the grain by means of a fertilizer sowing attachment to the seeder. The plots were one-fortieth of an acre each, and fifty-seven varieties were tested. The plots were sown May 7, with results as follows:—

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PEASE—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.		Weight per Bushel.
					Inches.	Inches.		Bush.	Lbs.	Lbs.
1	Agnes.....	Sept. 4.	120	Medium....	36	2	Large	40		62½
2	Archer.....	" 5.	121	"	36	2	Medium....	36		62
3	Bedford.....	" 4.	120	"	36	2	"	34	40	60
4	Multiplier	" 4.	120	"	38	2½	"	33	20	60
5	Victoria!	" 7.	123	"	40	2½	"	33	20	61
6	Macoun.....	" 5.	121	"	40	2½	Large	30	40	61½
7	Bright.....	" 5.	121	"	40	2½	"	30	40	60
8	Picton.....	" 4.	120	"	35	2	Medium....	30	40	62
9	Creepers.....	" 4.	120	"	34	2	Small	30		60
10	New Potter.....	" 4.	120	"	38	2½	Medium....	30		61
11	Dover.....	" 5.	121	"	40	2½	Large	30		60
12	Gregory.....	" 5.	121	"	36	2	Medium....	30		62
13	Herald.....	" 7.	123	"	36	2	"	30		61
14	Early Britain.....	Aug. 31.	116	"	38	2½	"	29	20	60
15	Grass Pea	Sept. 11.	127	"	40	1½	Small	29	20	60
16	Bruce.....	" 5.	121	"	38	2½	Medium....	28	40	60
17	Mackay.....	" 5.	121	"	40	2½	Large	28	40	61
18	Prince Albert.....	" 4.	120	"	36	2	Small	28	40	60
19	Prince.....	" 4.	120	"	36	2	Medium....	28		61
20	Large White Marrowfat.....	" 4.	120	"	40	3	Large	28		62
21	Fergus.....	" 5.	121	"	36	2	Medium....	28		60
22	Trilby	" 4.	120	"	38	2½	"	27	20	60
23	Duke.....	" 4.	120	"	36	2½	Large	27	20	61
24	Canadian Beauty.....	" 4.	120	"	36	2½	Medium....	27	20	62
25	Golden Vine.....	Aug. 31.	116	"	34	2	Small	27	20	62
26	Crown.....	Sept. 3.	119	"	34	2	"	26	40	61½
27	English Gray.....	" 2.	118	"	36	2	Medium....	26	40	60
28	Prussian Blue.....	" 1.	117	"	34	2	Small	26	40	61
29	Arthur	" 3.	119	"	40	2	Medium....	26	40	62
30	Wisconsin Blue.....	" 4.	120	"	36	2	"	26		62
31	Kent.....	" 5.	121	"	40	2½	Large	26		60
32	Black-eyed Marrowfat.....	" 4.	120	"	37	2½	"	26		61
33	Carleton.....	" 5.	121	"	36	2½	Medium....	26		60
34	Cooper.....	" 4.	120	"	34	2	Small	25	20	60
35	German White.....	Aug. 31.	116	"	36	2	Medium....	25	20	61
36	Lanark.....	Sept. 5.	121	"	38	2½	Large	25	20	60
37	Mummy.....	" 4.	120	"	38	2½	Medium....	25	20	62
38	Nelson.....	" 5.	121	"	40	2½	"	25	20	61
39	French Canner.....	" 5.	121	"	36	2	"	25	20	61
40	Chelsea	" 5.	121	"	38	2½	"	25	20	61
41	Chancellor	" 3.	119	"	34	2	Small	25	20	61
42	White Wonder.....	" 4.	120	"	32	2	Medium....	24	40	61
43	Centennial.....	" 5.	121	"	36	2	Small	24	40	61
44	Oddfellow.....	" 4.	120	"	36	2½	Medium....	24	40	62
45	Pearl	" 5.	121	"	36	2½	"	24		60
46	Elephant Blue.....	" 4.	120	"	34	2	Small	23	20	60
47	Alma.....	Aug. 31.	116	"	35	2½	Medium....	23	20	61½
48	Pride.....	Sept. 1.	117	"	34	2	"	23	20	62
49	Daniel O'Rourke.....	" 4.	120	"	35	2	Small	23	20	62
50	Elliot	" 4.	120	"	36	2½	Medium....	23	20	60
51	King	" 3.	119	"	40	2½	Large	20	40	61½
52	Elder.....	" 5.	121	"	37	2½	Medium....	20		60
53	Vincent	" 4.	120	"	35	2	"	20		61
54	Harrison's Glory.....	" 4.	120	"	34	2	"	20		61
55	Paragon.....	" 4.	120	"	34	2	"	19	20	61
56	Fenton.....	" 4.	120	"	40	2½	Large	18		69
57	Perth	" 2.	118	"	35	2	Medium....	18		60

EXPERIMENTS WITH BUCKWHEAT.

Five varieties of buckwheat were grown in one fortieth acre plots, on a sandy-loam soil. This land was previously in grain. It was manured in the fall with 25 one-horse cart loads of stable manure, per acre. This was then ploughed under. The ground was worked up in the spring with the spring-tooth and smoothing harrows, and the seed sown June 14. The crops obtained were as follows :—

Name of Variety.	Date of Sowing.	Date of Ripening.	No. of days Maturing.	Length of Straw.	Yield per Acre.		Weight per Bush.el.
				Inches.	Bush.	Lbs.	Lbs.
Silver Hull.....	June 14..	Sept. 9..	88	44	46	32	48
Tartarian or Siberian	" " ..	" 10..	89	44	41	32	48
Gray.....	" " ..	" 9..	88	42	25		48
Rye	" " ..	" 10..	89	46	45	40	50
Japanese	" " ..	" 9..	88	46	24	28	48

EXPERIMENTS WITH FIELD GRAIN.

The land on which this grain was grown was previously in turnips, having received for this crop 30 one-horse cart loads of manure per acre ; it being the first manure and only fertilizer this land had ever received. After the turnip crop was removed the land was ploughed. In the spring this was worked up with the disc, spring-tooth and smoothing harrows, and the seed sown May 15. The crop was harvested August 27. Each plot was one acre, and produced the following yields :

Name of Variety.	Yield per acre.	
	Bush.	Lbs.
Rosedale oats.....	55	17
Sensation oats.....	53	—
Mixed Grain (Barley, oats and pease).....	49	16
Cream Egyptian oats.....	47	—
Prolific Black Tartarian oats.....	46	—
Canadian Thorpe (Barley).....	41	27

FIELD CROP OF BUCKWHEAT.

Half of the field on which the buckwheat was grown was previously in buckwheat; the other half was new land which had just been brought in and had never before had a crop on it. This land is of a clay loam character, and was ploughed in the fall of 1901. This spring it was worked up with the disc, spring-tooth and smoothing harrows, and the grain was sown June 17. The land that had previously been in buckwheat was fertilized with complete fertilizer at the rate of 250 lbs. per acre. The new land did not get any fertilizer. The yields from these fields are as follows :—

	Yield per Acre.	
	Bush.	Lbs.
5 acres previously in buckwheat and fertilized.....	31	14
4½ acres new land and no fertilizer.....	14	16

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EXPERIMENTS WITH INDIAN CORN.

The corn was planted on a sandy loam. The land was previously in clover, and was manured on top of the second growth in the fall, with 25 one-horse cart loads of stable manure per acre. This was ploughed under in the spring after a good growth was made. The soil was worked up by going over it once each with the spade, spring-tooth and smoothing harrows. No fertilizer was used.

The corn was planted May 30 in rows and hills. Marks were made 3 ft. apart and the seed dropped, and covered with a hoe, and duplicate plots of each variety were planted in hills 3 ft. apart each way. The plants in the rows were thinned from 4 to 6 inches apart and 3 to 5 stalks were left to a hill. Thirty-seven varieties were planted. The variety named Early August came up, made weak growth of 3 or 4 inches, and died. The crop was harvested October 3. The yield per acre is estimated from that obtained from 2 rows each 66 feet long.

CORN—TESTS OF VARIETIES.

Number.	Name of Variety.	Height.	When Tasseled.	In Silk.	Condition when Cut.	Weight per Acre grown in Rows.		Weight per Acre grown in Hills.	
						Tons.	Lbs.	Tons.	Lbs.
1	Giant Prolific Ensilage.....	96	Sept. 5.	.....	Watery.....	25	600	25	50
2	Eureka.....	100	" 4.	.....	Tasseled....	25	600	22	1,100
3	Thoroughbred White Flint....	94	" 6.	.....	Watery.....	24	1,500	25	1,150
4	Salzer's All Gold.....	96	Aug. 21.	Sept. 8.	".....	23	1,300	23	750
5	Mammoth Eight-rowed Flint...	84	" 25.	" 6.	".....	23	750	22	1,100
6	Salzer's Superior Fodder.....	100	" 27.	" 9.	".....	22	1,100	21	900
7	Canada White Flint...	96	" 22.	" 1.	".....	22	1,100	20	1,520
8	Compton's Early.....	90	" 20.	" 1.	Soft Glazed.	22	1,100	20	1,520
9	Early Butler.....	96	" 27.	" 5.	Watery.....	22	1,100	20	150
10	White Cap Yellow Dent.....	100	" 27.	" 8.	Milk.....	22	550	21	900
11	Red Cob Ensilage.....	96	Sept. 6.	.....	Tasseled....	22	..	22	1,650
12	Longfellow.....	90	Aug. 20.	Aug. 27.	Soft glazed..	22	..	23	200
13	Evergreen Sugar.....	92	Sept. 1.	.....	Early milk..	22	..	20	1,800
14	Pride of the North..	100	" 6.	Sept. 5.	Watery.....	21	1,450	21	570
15	Mammoth Cuban.....	100	" 1.	" 5.	".....	21	900	20	1,800
16	North Dakota Yellow.....	84	Aug. 20.	" 1.	Late milk...	20	1,250	20	1,800
17	Black Mexican.....	80	" 27.	" 9.	Watery.....	20	1,250	18	300
18	Sanford.....	84	" 25.	Sept. 6.	".....	20	700	19	550
19	Pearce's Prolific.....	90	" 18.	Aug. 25.	Soft glazed..	20	150	19	1,050
20	Early Yellow Long Eared ...	90	" 18.	" 25.	".....	19	1,600	19	1,600
21	King Philip.....	84	" 25.	Sept. 5.	Watery.....	19	1,270	21	1,450
22	North Dakota White.....	84	" 20.	" 1.	Late milk...	19	1,050	20	150
23	Angel of Midnight.....	90	" 25.	Sept. 1.	Soft glazed..	19	550	16	1,000
24	King of the Earliest..	90	Sept. 5.	.....	Tasseled....	19	550	20	700
25	Selected Leaming.....	100	" 1.	Sept. 10.	Early milk..	18	1,400	20	1,250
26	Early Mastodon.....	96	" 1.	" 15.	Watery.....	18	1,400	17	650
27	Champion White Pearl.....	96	Aug. 25.	" 4.	Milk.....	18	850	18	1,400
28	Wisconsin Earliest Dent.....	98	" 27.	" 5.	Watery.....	18	300	17	1,750
29	Cloud's Early Yellow.....	100	Sept. 1.	" 7.	".....	17	1,750	18	850
30	Kendall's Early Giant.....	68	Aug. 20.	Aug. 27.	Soft glazed..	17	1,750	16	1,550
31	Early Golden Surprise.....	96	" 27.	Sept. 6.	Watery.....	17	650	17	1,200
32	Country Gentleman.....	84	Sept. 8.	.....	Tasseled....	17	650	17	1,750
33	Extra Early Huron Dent.....	90	" 18.	Sept. 25.	Watery.....	16	1,000	12	1,300
34	Yellow Six-weeks....	66	Aug. 10.	Aug. 20.	Glazed.....	12	1,850	12	750
35	Earliest Ripe.....	64	" 10.	" 18.	".....	12	750	15	250
36	Mitchell's Extra Early..	60	" 18.	" 8.	Hardglazed.	12	200	11	..

CORN SOWN IN ROWS AT DIFFERENT DISTANCES APART.

Experiments were again conducted, with Indian Corn sown in rows at different distances apart, Champion White Pearl, Selected Leaming and Longfellow were the varieties sown.

The land on which these were sown was similar and received the same treatment in every respect as the corn plots. The seed was sown May 31 in rows 21, 28, 35 and 42 inches apart. The crop was harvested October 3. The plots were one-fortieth acre each,

CORN PLANTED AT DIFFERENT DISTANCES APART.

Sown May 31.

Name of Variety.	Distance Apart.	Yield per Acre.	
	Inches.	Tons.	Lbs.
Selected Leaming.....	21	15	1,000
".....	28	17	80
".....	35	16	520
".....	42	14	1,160
Champion White Pearl.....	21	15	1,320
".....	28	16	400
".....	35	15	1,880
".....	42	14	440
Longfellow.....	21	15	200
".....	28	15	1,480
".....	35	15	1,200
".....	42	13	1,720

EXPERIMENTS WITH TURNIPS.

The land on which the turnips were grown was clay loam and the previous crop was clover. The ground was manured in the fall with 15 one-horse cart loads of stable manure per acre and ploughed. In the spring it was harrowed with the disc and spring-tooth harrows, and 15 one-horse cart loads of stable manure again spread broadcast and ploughed in. The land was then gone over with the disc, spring tooth and smoothing harrow, and 200 pounds of complete fertilizer and 200 lbs. bone meal per acre sown broadcast and harrowed in with the smoothing harrow.

The ground was then run into rows 24 inches apart, the rows were raked off by hand and marks were made along the top, where the seed was dropped and lightly covered.

The plots were sown May 20, and duplicate ones two weeks later, June 3. The roots were pulled October 30, and the quantity per acre calculated from the weight of the crop obtained from two rows each 66 feet long.

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TURNIPS—TEST OF VARIETIES.

No.	Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
		Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
1	Sutton's Champion.....	50	155	1,669	15	42	975	1,416	15
2	Elephant's Master.....	49	1,000	1,650		38	1,550	1,292	30
3	Magnum Bonum.....	47	380	1,573		37	250	1,237	30
4	Giant King.....	47	50	1,567	30	34	1,795	1,163	15
5	Perfection Swede.....	46	1,555	1,559	15	38	395	1,273	15
6	Prize Purple Top.....	46	400	1,540		38	1,055	1,284	15
7	Carter's Elephant.....	45	1,905	1,531	45	36	1,525	1,058	45
8	Hall's Westbury.....	45	750	1,512	30	37	1,075	1,251	15
9	Good Luck.....	45	750	1,512	30	34	475	1,141	15
10	Kangaroo.....	45	255	1,504	15	34	475	1,141	15
11	Drummond's Purple Top.....	44	1,430	1,490	30	35	125	1,168	45
12	West Norfolk Red Top.....	44	605	1,476	45	35	950	1,182	30
13	Hartley's Bronze.....	43	625	1,443	45	35	455	1,174	15
14	Bangholm Selected.....	42	1,800	1,430		36	1,755	1,229	15
15	Shamrock Purple Top.....	42	1,305	1,421	45	36	600	1,210	
16	New Arctic.....	42	1,140	1,419		31	700	1,045	
17	Halewood's Bronze Top.....	42	975	1,416	15	36	1,425	1,223	45
18	Champion Purple Top.....	41	1,655	1,394	15	37	1,405	1,256	45
19	Imperial Swede.....	41	830	1,380	30	31	1,855	1,064	15
20	Selected Purple Top.....	41	500	1,375		31	205	1,036	45
21	Selected Champion.....	41	5	1,366	45	34	1,300	1,155	
22	Marquis of Lorne.....	40	1,675	1,361	15	32	350	1,072	30
23	Mammoth Clyde	40	25	1,333	45	28	1,750	962	30
24	Prize Winner.....	38	1,055	1,284	15	29	905	981	45
25	Emperor Swede.....	38	725	1,278	45	28	1,750	962	30
26	East Lothian.....	38	230	1,270	30	28	100	935	
27	Skirving's	37	1,900	1,265		28	1,750	962	30
28	Monarch.....	36	1,425	1,223	45	27	1,275	921	15
29	New Century.....	36	600	1,210		29	475	974	35
30	Webb's New Renown.....	35	125	1,168	45	27	450	907	30
31	Jumbo	34	805	1,146	45	27	1,275	921	15

EXPERIMENTS WITH MANGELS.

The land on which the mangels were grown was adjoining the turnip plots and received the same treatment in every respect.

The ground was run into rows 24 inches apart. The rows were raked off and the seed sown in holes one foot apart, made with a marker, and from four to eight seeds were dropped in each place. These were covered with a garden rake. The plants came up well and made splendid growth.

The seed was sown May 20, and duplicate plots were sown two weeks later, June 3. The crop was pulled October 28, and the yield calculated from 2 rows each 66 feet long.

MANGELS—TEST OF VARIETIES.

No.	Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
		Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
1	Lion Yellow Intermediate.....	50	1,145	1,685	45	40	1,840	1,364	
2	Selected Yellow Globe.....	47	50	1,567	30	37	745	1,245	45
3	Champion Yellow Globe.....	46	235	1,537	15	37	1,570	1,259	30
4	Mammoth Yellow Intermediate	45	915	1,515	15	35	1,445	1,190	45
5	Giant Yellow Half-long.....	44	1,760	1,496		35	1,445	1,190	45
6	Giant Yellow Intermediate.....	44	1,595	1,493	15	36	1,425	1,223	45
7	Gate Post.....	44	935	1,482	15	36	105	1,201	45
8	Mammoth Long Red.....	41	1,490	1,391	30	34	475	1,141	15
9	Golden Fleshed Tankard	41	1,490	1,391	30	33	1,485	1,124	45
10	Yellow Fleshed Tankard.....	41	500	1,375		34	970	1,149	30
11	Half-long Sugar White.....	40	335	1,339	15	32	1,505	1,091	45
12	Yellow Intermediate.....	40	190	1,336	30	35	1,775	1,196	15
13	Prize-winner Yellow Globe.....	40	25	1,333	45	36	270	1,204	30
14	GatePost Yellow.....	39	210	1,303	30	34	1,960	1,166	
15	Giant Sugar.....	38	1,715	1,295	15	33		1,100	
16	Canadian Giant.....	38	1,220	1,287		32	1,175	1,086	15
17	Mammoth Oval-shaped.....	38	725	1,278	45	28	1,255	954	15
18	Warden Orange Globe.....	38	230	1,270	30	28	1,420	957	
19	Triumph Yellow Globe.....	38	65	1,267	45	36	1,590	1,226	30
20	Norbiton Giant.....	37	1,900	1,265		24	1,170	819	30
21	Prize Mammoth Long Red.....	37	1,075	1,251	15	31	1,525	1,058	45
22	Giant Yellow Globe.....	37	580	1,243		29	245	970	45
23	Selected Mammoth Long Red.....	36	1,755	1,229	15	35	125	1,168	45
24	Red Fleshed Tankard.....	36	1,425	1,223	45	28	1,255	954	15
25	Half-long Sugar Rosy.....	35	1,280	1,188		33	1,320	1,122	
26	Ward's Large Oval-shaped.....	33	1,650	1,127	30	26	1,625	893	45
27	Leviathan Long Red.....	31	865	1,047	45	30	225	1,003	45

EXPERIMENTS WITH CARROTS.

The plots of carrots were sown May 20 and duplicate ones two weeks later, June 3. Each plot consisted of 2 rows 66 feet long. The roots were gathered October 24.

The land was adjoining the turnip and mangel plots and received the same preparation and treatment. The rows were run 24 inches apart, raked off by hand and a mark made along the top of the row, into which the seed was dropped, and covered, with a garden rake.

CARROTS.—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Half Long White.....	22	550	742	30	20	1,745	695	45
Yellow Intermediate.....	22	220	737		18	1,455	624	15
Improved Short White.....	21	900	715		16	340	539	
Green Top White Orthe.....	21	900	715		20	1,085	648	45
Iverson's Champion.....	21	405	706	45	19	1,435	657	15
Mammoth White Intermediate.....	21	240	704		18	300	605	
New White Intermediate.....	21	75	701	15	17	1,310	588	30
Giant White Vosges.....	20	1,250	687	30	17	650	577	30
Ontario Champion.....	20	755	679	15	17	815	580	15
White Belgian.....	19	1,930	665	30	15	360	506	
Long Yellow Stump Rooted.....	19	610	643	30	15	360	506	
Long Scarlet Altringham.....	17	650	577	30	14	1,865	497	45
White Vosges, Large Short.....	16	1,660	561		13	1,555	459	15
Scarlet Intermediate.....	16	1,000	550		14	1,700	459	
Half Long Chantenay.....	16	505	541	45	17	815	580	15
Guerande or Oxheart.....	16	1,350	522	30	13	1,885	464	45
Carter's Orange Giant.....	15	855	514	15	17	815	580	15
Scarlet Nantes.....	15	525	508	45	13	400	440	
Long Orange or Surrey.....	14	1,700	495		13	1,720	462	
Early Gem.....	14	875	481	15	12	585	409	45

EXPERIMENTS WITH SUGAR BEETS.

The land on which these were grown was adjoining the carrot, turnip and mangel plots, and received the same treatment. The rows were made 24 inches apart, raked off and the seed sown in holes made with a marker, one foot apart, and from 3 to 6 seeds dropped in a hole. These were covered with a garden rake.

The seed was sown May 20 and duplicate plots June 3. The crop was harvested October 28. The yield per acre is calculated from 2 rows, each 66 feet long.

SUGAR BEETS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre 1st. Plot.		Yield per Acre 1st. Plot.		Yield per Acre 2nd. Plot.		Yield per Acre 2nd. Plot.	
	Tons	Lbs.	Bush.	Lbs.	Tons	Lbs.	Bush.	Lbs.
Royal Giant.....	37	1,240	1,254	0	34	1,300	1,155	0
Danish Improved.....	32	1,020	1,067	0	24	1,830	830	35
Danish Red Top.....	31	1,525	1,058	45	25	325	838	45
Red Top Sugar.....	30	1,380	1,023	0	25	820	847	0
Improved Imperial.....	28	1,255	954	15	24	1,500	825	0
Wanzleben.....	28	925	948	45	20	1,250	687	30
French "Very Rich".....	23	200	770	0	18	300	605	0
Vilmorin's Improved..	20	1,250	687	30	17	1,475	591	15

EXPERIMENTS WITH POTATOES.

Ninety varieties of potatoes were planted May 29 and were dug September 24, 25. The yield per acre is calculated from 2 rows each, 66 feet long. The soil was a sandy loam and the previous crop was mixed grain. This land was manured in the fall of 1901 with 25 one-horse cart loads of stable manure per acre, this being the only fertilizer of any kind that had been applied for many years. In the spring the land was worked up once each with spring-tooth and disc harrows and then ploughed. The disc, spring-tooth and smoothing harrows were then each put over the ground, which was run into drills 30 inches apart. Commercial Fertilizer at the rate of 400 pounds per acre was scattered in these drills, and the potato sets were planted one foot apart, and covered with the plough.

The seed was cut leaving from 2 to 3 eyes to a piece. The plots were sprayed with Paris green and water July 12, and with Bordeaux mixture and Paris green July 24 and August 14, there was no blight. The crop of potatoes was exceptionally good. There were no rotten ones. The following table gives the yield per acre.

POTATOES—TEST OF VARIETIES.

Name of Variety.	Quality.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Un-marketable.		Form and Colour.
		Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Dakota Red	Fair	517	..	440	..	77	..	Round, red.
Canadian Beauty	Good	499	24	433	24	66	..	Oblong, pink and white.
Enormous	Fair	495	..	451	..	44	..	Oblong, white.
Great Divide	Good	495	..	440	..	55	..	Long, white.
Rose No. 9	"	495	..	440	..	55	..	Oblong, pink.
Troy Seedling	Fair	484	..	413	36	70	24	Round, white.
Seattle	"	479	36	413	36	66	..	Long, white.
Early Norther	Good	473	..	418	..	55	..	Long, pink and white.
Irish Daisy	"	473	..	345	24	127	36	Round, white.
Pearce's Prize Winner	"	468	36	409	12	59	24	Long, white.
Clay Rose	Fair	462	..	385	..	77	..	Round, pink.
Hale's Champion	"	462	..	380	36	81	24	Long, white.
Quaker City	Good	453	12	415	48	37	24	Round, white.
Everett	"	451	..	341	..	110	..	Flattish, pink.
Rural No. 2	"	451	..	396	..	55	..	Round, white.
Northern Spy	"	451	..	396	..	55	..	Round, red.
Carman No. 3	"	451	..	407	..	44	..	Round, white.
Bill Nye	"	451	..	363	..	88	..	"
McIntyre	Fair	446	36	385	..	61	36	Round, white and blue.
Rochester Rose	Good	444	24	391	36	52	48	Oblong, pink.
Seedling No. 7	Fair	440	..	396	..	44	..	Oval, pink.
Vick's Extra Early	Good	440	..	385	..	55	..	"
Rural Blush	"	437	48	389	24	48	24	Round, pink.
Seedling No. 230	Fair	426	48	321	12	105	36	Round, white.
Money Maker	Good	424	36	358	36	66	..	Long, pink and white.
Sir Walter Raleigh	"	422	24	367	24	55	..	Round, pink and white.
Sharpe's Seedling	"	422	24	347	..	48	24	"
Holborn Abundance	Fair	418	..	341	..	77	..	Round, white.
Early White Prize	Good	418	..	367	24	50	36	Round, pink.
Pride of the Market	"	415	48	358	36	57	12	Long, pink and white.
Penn. Manor	"	407	..	352	..	55	..	Long, pink.
Vanier	Fair	404	48	358	36	46	12	"
Pearce's Extra Early	Good	404	48	347	36	57	12	"
Burnaby Seedling	Fair	400	24	356	24	44	..	Round, pink.
Flemish Beauty	Good	400	24	341	..	59	24	Long, flat and pink.
White Beauty	"	393	48	352	..	41	48	Long, round and white.
Early Market	"	391	36	316	48	74	48	Round, pink.
Lizzie's Pride	Fair	391	36	259	36	132	..	Long, pink.
Houlton Rose	Good	389	24	345	24	44	..	"
Cambridge Russet	"	389	24	314	36	74	48	Round, white.
Carman No. 1	Very good ..	387	12	338	48	48	24	Flat, round and white.
Irish Cobbler	Good	385	..	286	..	99	..	Round, white.

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POTATOES—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Quality.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Un-marketable.		Form and Colour.
		Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
American Giant.....	Fair.....	385	..	319	..	66	..	Long, white.
Burpee's Extra Early.....	Good.....	382	48	308	..	74	48	Long, pink and white.
Dreer's Standard.....	".....	380	36	314	36	66	..	Round, white.
General Gordon.....	".....	378	24	316	48	61	36	Oblong, pink.
Early St. George.....	".....	376	12	305	48	70	24	Oblong, pink and white.
Late Puritan.....	".....	376	12	343	12	33	..	Long, white.
Early Puritan.....	".....	374	..	330	..	44	..	"
Early Sunrise.....	".....	374	..	312	24	61	36	Long, pink.
Brown's Rot Proof.....	Fair.....	367	24	264	..	103	24	Oval, pink.
Uncle Sam.....	Good.....	365	12	312	24	52	48	Oblong, white.
New Variety, No 1.....	Fair.....	363	..	308	..	55	..	Round, white.
American Wonder.....	".....	363	..	319	..	44	..	"
Bovee.....	Good.....	360	48	294	48	66	..	Long, pink.
State of Maine.....	".....	360	48	308	..	52	48	Round, white.
Green Mountain.....	".....	360	48	305	48	55	..	Oval, white.
Early Ohio.....	".....	358	36	303	36	55	..	Long, pink.
I. X. L.....	".....	356	24	297	..	59	24	Long, pink and white.
Reeve's Rose.....	".....	356	24	303	36	52	48	Long, pink.
Maggie Murphy.....	Fair.....	352	..	308	..	44	..	"
Empire State.....	Good.....	347	36	299	12	48	24	Oval, white.
Columbus.....	".....	343	12	303	36	39	36	Long, white.
New Queen.....	".....	343	12	255	12	88	..	Oblong, pink.
Beauty of Hebron.....	".....	338	48	266	12	72	36	Round, pink and white.
Prize Taker.....	".....	338	48	286	..	52	48	Round, white.
Thorburn.....	".....	336	36	279	24	57	12	Oblong, pink and white.
Ohio Junior.....	".....	336	36	270	36	66	..	Round, pink.
Delaware.....	".....	334	24	286	..	48	24	Round, white.
Clarke's No. 1.....	Fair.....	323	24	294	48	28	36	Long, pink.
Lee's Favourite.....	Good.....	319	..	264	..	55	..	Round, white.
Chicago Market.....	".....	319	..	268	24	50	36	Long, red.
Early Six Weeks.....	".....	312	24	253	..	59	24	Oblong, pink.
Sabean's Elephant.....	".....	308	..	264	..	44	..	Oblong, white.
Maule's Thoroughbred.....	Fair.....	303	36	257	24	46	12	"
Early Michigan.....	Good.....	297	..	253	..	44	..	Long, white.
Early Andes.....	".....	297	..	246	24	50	36	Round, pink.
Polaris.....	".....	297	..	250	48	46	12	Long, white.
Daisy.....	".....	294	48	246	24	48	24	Long, pink and white.
Country Gentleman.....	".....	286	..	244	12	41	48	"
Early Rose.....	".....	279	24	220	..	59	24	Long, pink.
Reading Giant.....	Fair.....	275	..	209	..	66	..	Oval, pink.
Rawdon Rose.....	".....	275	..	220	..	55	..	Oblong, pink and white.
Prolific Rose.....	Good.....	270	36	226	36	44	..	"
Earliest of All.....	".....	261	48	220	..	41	48	Long, pink.
Early Harvest.....	".....	259	36	209	..	50	36	Oval, pink and white.
Brownell's Winner.....	Fair.....	253	..	220	..	33	..	Long, pink.
Swiss Snowflake.....	".....	244	12	209	..	35	12	Round, white.
Up to Date.....	".....	213	24	176	..	37	24	"

EXPERIMENTS WITH MILLETS.

Five varieties of millet were sown in one-fortieth acre plots, with the Planet, Jr., seed drill June 14. The soil was clay loam and the previous crop was potatoes. The land was ploughed in the fall and in the spring was worked up with the disc, spring-tooth and smoothing harrows. No fertilizer was used. The crop was harvested green Sept. 15, and the yield per acre obtained was as follows:—

Name of Variety.	Yield per Acre.	
	Tons.	Lbs.
Italian or Indian	13	
Moha Hungarian	8	1,080
White Round Extra French	7	120
Algerian or Early Pearl	4	1,120
Cat Tail did not germinate		

EXPERIMENTS WITH SOJA BEANS.

The soil was clay loam. The land was previously planted with potatoes, and was manured for that crop at the rate of 30 one-horse cart loads per acre in the fall of 1900. After the potato crop was removed the land was ploughed. In the spring it was worked up with the disc, spring-tooth and smoothing harrows. The beans were sown with the Wisner seed drill, June 2, in rows 21, 28 and 35 inches apart, and the crop cut and weighed Oct. 3.

The object of this experiment was to obtain information as to the value of this plant as a forage crop, and to obtain the yields per acre from seed sown at different distances apart. The plots were one-fortieth acre each. The crop made fair growth only and did not mature as well as usual.

Distances Apart.	Yield per Acre.	
	Tons.	Lbs.
Soja Beans, 21 inches.	9	
" 28 "	8	1,800
" 35 "	8	1,080

EXPERIMENTS WITH HORSE BEANS.

The horse beans were sown June 2nd in plots of one-fortieth acre each. The English variety "Tick" was used. The seed was sown in rows 21, 28 and 35 inches apart. The soil was similar to that on which the soja beans were grown. and received the same treatment.

The beans did not make their usual growth. The horse bean aphid was not as bad as last season, but did considerable damage. The following yield was obtained, from plots cut October 3 :—

Distances apart.	Yield per acre.	
	Tons.	Lbs.
Horse beans, 21 inches.	10	1,200
" 28 "	10	1,800
" 35 "	10	1,080

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EXPERIMENTS WITH FERTILIZERS ON WHEAT.

These experiments which were also conducted last year are for the purpose of learning the value of different fertilizers for economic grain production. The variety 'Preston' was used and the size of each plot was one-fortieth acre. Six plots were included in the test.

One half of the nitrate of soda on plots 1 and 2 was sprinkled finely over the ground, when the grain was 2 inches high, and the other half when it was 6 inches high. The fertilizers on plots 4 and 5 were scattered on the ground just before sowing and lightly covered with the harrow. On plot 6 one-half of the fertilizer was scattered on the ground just before sowing and lightly covered with the harrow, and the other half was scattered over the ground when the grain was 2 or 3 inches high. Plot 3 was not fertilized, being left for a check. The land on which these plots were located was previously in grain. The results obtained are given in the following table :—

EXPERIMENTS WITH FERTILIZERS ON WHEAT.

(Sown May 22. Cut Sept. 13).

Plot.	Variety of Wheat Sown.	Fertilizers used per Acre.		Yield per Acre.	
			Lbs.	Bush.	Lbs.
1	Preston.....	Nitrate of Soda.....	100	38	
2	"	"	200	40	
3	"	Check.....		34	40
4	"	Superphosphate	400	41	20
5	"	Muriate of Potash.....	400	44	
6	"	Mixture of { Superphosphate.....	200	} 39	20
		{ Muriate of Potash.....	100		
		{ Nitrate of Soda.....	100		

SPECIAL EXPERIMENTS WITH FERTILIZERS.

These experiments were repeated again this season, the object being to ascertain the relative value of fertilizers commonly used for field crops of various kinds. The plots were one-eighth acre each 38 x 143½ ft. for each kind of fertilizer used. These were subdivided into ten strips 14 ft. wide, each running lengthwise across all the differently fertilized plots. These strips were sown with ten different kinds of crops, namely: potatoes, turnips, carrots, mangels, oats, wheat, barley, pease, corn, and mixed grain making in all 140 plots. A margin of 2 feet was left between each plot, and one foot between each crop plot. Two plots were left without any fertilizer to serve as check plots. The strips that are in grain one year are planted to roots, potatoes and corn the following year. The quantity and kind of fertilizer used is applied each year. Each of the crops is sown at about the same time as the uniform trial plots with the same amount of seed per acre, and is cultivated in the same manner. This is the fourth year of the test. The following table gives the yield per acre of the various crops.

SPECIAL EXPERIMENTS WITH FERTILIZERS.

Fertilizer Used.	Barley, Canadian Thorpe.		Oats, Banner.		Wheat, Colorado.		Barley, oats and pease.		Pease, Golden Vine.		Corn, Longfellow.		Turnips, Prize Purple Top.		Mangels, Giant Yellow Intermediate.		Carrots, Half Long White.		Potatoes, Delaware.	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Manure, 30 tons	62	24	100		41	40	85		36	40	20		44	1,000	40	1,500	24	1,700	550	
Manure, 15 tons, fertilizer, 250 lbs	64	28	105	30	43	20	90		35		17	1,000	47	1,000	42		31	600	530	
Complete fertilizer, 1,000 lbs	52	4	82	12	28	20	62	20	33	20	13	1,500	40	50	25	1,000	18	800	416	40
Complete fertilizer, 500 lbs	43	36	76	16	25	50	60		29	10	13	500	33	500	26	1,700	14	1,000	441	40
Check	41	32	67	22	25		50		26	40	10		25	1,500	6	500	9		366	40
Bone meal, 1,000 lbs.	47	44	79	14	26	40	55		30		13		36		16	1,700	15	700	388	20
" 500 "	45	40	76	16	30		67	20	28	20	12	1,000	33	1,000	11	1,000	15		290	
Ashes 2,500 "	52	4	70	20	28	20	60		34	10	13	1,500	40	1,500	29	1,200	18	700	383	20
Manure, rotted, 20 tons ..	63	26	114	24	41	40	90		41	40	17	500	45	1,500	40	500	25	1,200	510	
Check	25		61	26	20		35		25		6	1,500	16	300			4	1,500	240	
Land plaster, 500 lbs.	29	8	64	24	23	20	40		26	40	6	1,500	20		8	1,000	8	1,000	243	20
Salt, 500 "	41	32	73	18	25		45		27	30	7	1,500	25	1,700	27	300	10	700	216	40
Marsh mud, 100 tons	48	46	82	12	30		70		31	40	11	1,000	31	1,200	31	1,200	18	1,100	271	40
Manure, green, 20 "	70	40	111	26	45		92	20	40		16	500	44	1,500	44	1,500	23	400	571	40

EXPERIMENTS WITH FIELD CORN.

The land on which this corn was grown was previously in clover. It was manured in the fall with 20 one-horse cart loads of stable manure per acre. This was ploughed under in the spring just before planting after a good growth had been made. The land was worked up by going over it once, each with spade, spring-tooth and smoothing harrows. The seed was sown with the seeder in rows 3 feet apart on May 31. June and July were cold and backward and this crop made very poor growth in these months, but in August and September it made a surprisingly rapid growth. One-half acre of each of the following varieties was planted, and the crop was harvested October 4. The following yields per acre were obtained:—

Name of Variety.	Yield per Acre.	
	Tons.	Lbs.
½ acre plots—		
Selected Leaming.....	14	900
Mammoth Cuban.....	13	1,720
Longfellow.....	13	1,060
Early Butler.....	13	900
Cloud's Early Yellow.....	12	1,550
Compton's Early.....	12	1,140
Angel of Midnight.....	12	500

EXPERIMENTS WITH FIELD TURNIPS.

One acre plots each of five varieties were sown. The soil was a clay loam in a poor state of fertility, no manure having been previously applied and the previous crops being grain. Manure at the rate of 35 one-horse cart loads per acre was spread broad cast in the spring and ploughed under. This was worked up with the disc, spring-tooth and smoothing harrows, and rows run 24 inches apart.

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Before the rows were run one-half of each acre plot received complete fertilizer at the rate of 200 lbs. per acre. This was sown broadcast. The yield per acre was calculated from the weight obtained from each plot of one-half acre. The seed was sown June 12, and the crop pulled from November 3 to 8. The yields obtained were as follows:—

FIELD CROPS OF TURNIPS.

(Sown June 12, Pulled November 3 to 8.)

Name of Variety and Size of Plot.	Yield per Acre.		Yield per Acre.	
	Tons.	Lbs.	Bush.	Lbs.
$\frac{1}{2}$ acre plots—				
Hartley's Bronze, manure with fertilizer.....	31	1,071	1,051	11
" " " only.....	30	600	1,010	
Giant King, manure with fertilizer.....	31	310	1,038	30
" " " only.....	28	340	939	
Prize Purple Top, manure with fertilizer.....	30	1,244	1,020	44
" " " only.....	30	744	1,012	24
Drummond Purple Top, manure with fertilizer.....	30	390	1,006	30
" " " only.....	28	790	946	30
Kangaroo, manure with fertilizer.....	29	650	977	30
" " " only.....	28	16	933	36

EXPERIMENTS WITH FIELD MANGELS.

The land on which these mangels were grown was clay loam, and was previously in clover. The second growth was ploughed under in the fall, and in the spring 20 one-horse cart loads of stable manure per acre was spread broadcast and ploughed in. The land was gone over twice with the spade harrow before the manure was applied, and after the ploughing the spade, spring-tooth and smoothing harrows were used. The land was then run into rows, each 24 inches apart, and the seed sown with a seeder in a continuous row, which came up very irregularly, and although there were not many blanks, yet the slow starting plants, of which there were many, made very slow growth. This was apparently due to the poor germinating power of a large portion of the seed.

Three varieties were grown of one acre each. One-half acre of each variety was fertilized before the rows were run up by sowing broadcast complete fertilizer at the rate of 200 lbs. per acre. The seed was sown May 29 and the crop harvested from October 17 to 23, giving the following yields:—

FIELD CROP OF MANGELS.

(Sown May 29, Pulled Oct. 17 to 23.)

Name of Variety and Size of plot.	Yield per acre.		Yield per acre.	
	Tons	Lbs.	Bush.	Lbs.
$\frac{1}{2}$ acre plots—				
Yellow Intermediate, manure with fertilizer..	22	1,790	763	30
" " " only.....	19	239	637	10
Mammoth Long Red, manure with fertilizer.....	20	550	675	50
" " " only.....	18	1,040	617	20
Yellow Globe, manure with fertilizer.....	18	580	609	40
" " " only.....	17	590	576	30

EXPERIMENTS TO TEST THE VALUE OF BUG DEATH AS COMPARED WITH PARIS GREEN AND BORDEEAX AND PARIS GREEN ON POTATOES.

The object of this experiment was to test the value of Bug Death as a useful material to kill the potato bug, as compared with Paris green and to test its fungicidal value as compared with Bordeaux mixture.

Three plots one-eighth of an acre each were laid out, one was sprayed with Paris green and water at the rate of $\frac{1}{2}$ pound of Paris green to 40 gallons of water, to which was added one gallon lime water ; one with Bordeaux mixture and Paris green, made by using 4 pounds of blue stone, 4 lbs. of unslacked lime, $\frac{1}{2}$ lb. of Paris green and 40 gallons of water, and one with Bug Death, 5 lbs. being dusted on at each application, three applications were made, one on July 12, one July 24 and one Aug. 14. There was no blight this season consequently its effect as a fungicide could not be ascertained.

The ground was similar to that on which the potato plots were situated, and received the same treatment. The Delaware potato was the variety used in this test The following yields per acre were obtained.

	Marketable.		Unmarketable.		Total.	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Bordeaux mixture and Paris green.....	363	25	43	45	407	10
Bug Death.....	370	25	46	40	417	5
Paris green.....	367	30	36	10	403	40

The Paris green was put on in the form of a spray and at the rate of two forty-gallon casks per acre at each application. Three-quarters of a pound of Paris green was used to each cask of water. This would make $1\frac{1}{2}$ lbs. of Paris green per acre at each application and for the three applications $4\frac{1}{2}$ lbs. at 25 cts. per pound would total \$1.13 per acre as the cost of material on the Paris green plots.

The Bordeaux mixture was used also at the rate of two forty-gallon casks per acre at each application. The cost of material for each application would be :—8 lbs. Blue stone at 7c. per lb., 56c. ; 8 lbs. Rock lime at 1c. per lb., 8c. and $1\frac{1}{2}$ lbs. of Paris green at 25 cts. per lb., 38 cts. making a total cost of \$1.02 per acre for each application. Three applications at \$1.02 would make a total cost of \$3.06 per acre for Bordeaux used. This material was sprayed on the plants.

The application of Bug Death made, was as effective in killing the bugs as Paris green. For killing bugs alone two applications of Bug Death proved sufficient. The third application was made to determine its efficiency as a fungicide. There was no blight, consequently its value in this respect could not be determined.

Three applications of Bug Death at the rate of 40 lbs. per acre at each time made a total of 120 lbs. per acre. This material is sold at the rate of \$7 per 100 lb. keg. This would make a cost of \$8.40 per acre for the Bug Death used in this experiment. The Bug-Death was put on dry with a duster and our experience would indicate that it is difficult to dust the plants thoroughly with a less amount than 40 pounds per acre at one time.

Two applications of Paris green proved sufficient to kill the bugs this season and the third application was given in order to make the number of applications for each plot uniform. The cost of putting on these materials was practically the same in each case.

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The following summary gives the total yield per acre and the cost of materials used per acre.

	Total yield per acre.		Cost of material used.
	Bush.	lbs.	Per acre.
Bug Death..	417	5	\$8 40
Bordeaux mixture..	407	10	3 06
Paris green..	403	40	1 13

RUSSIAN SUNFLOWERS.

The sunflower seed was sown in rows 3 feet apart with the Wisner seed drill. The land was previously in grain, and was manured in the fall of 1901, with 25 one-horse cart loads of stable manure per acre, which was ploughed under. In the spring this was worked up with the spring-tooth, disc, and smoothing harrows. The seed was sown May 17 in one-fortieth acre plots. The crop of heads was cut Oct. 4 and the yield per acre was 5 tons 700 lbs.

HAY.

The upland which was seeded down to clover and timothy, yielded 57 tons 470 lbs. from 18 acres.

The underdrained marsh of 9 acres yielded 16 tons 1,500 lbs. The remainder of marsh of 41 acres yielded 64 tons 475 lbs. This made a total of 138 tons 445 lbs. of hay harvested, which was secured in good condition.

CORRESPONDENCE.

There were 1,616 letters received and 1,336 sent out during the year, apart from the receipt and dispatch of circulars and reports.

GRAIN AND POTATO DISTRIBUTION.

Some of the most promising varieties of grain and potatoes were again distributed this year to farmers who made application. The following number of three pound packages were sent to various places.

Potatoes..	325
Oats..	208
Wheat..	83
Barley..	67
Pease..	40
Buckwheat..	16
Winter Rye..	6
Total..	745

EXHIBITIONS AND AGRICULTURAL MEETINGS.

An exhibit of farm produce was made at the International Exhibition, St. John, N.B., Aug. 30 to Sept. 6, at the Nova Scotia Provincial Exhibition, Halifax, N.S., Sept. 10 to 18, and at the Prince Edward Island Exhibition, Charlottetown, P.E.I., Sept. 23 to 26. This exhibit was made up of grains, fruits, vegetables and roots grown on the farm during the past season.

Besides occasional agricultural addresses at various places, I delivered a series of lectures at Sussex, to the students taking the dairy course at the Sussex Dairy School March 14 to 26.

HORSES.

During this year one draught horse was bought. There are now on the farm seven horses, five of which are used exclusively for draught purposes, one for express work, and one for driving.

DAIRY CATTLE.

The herd on the farm at present consists of:—

1 Guernsey bull, 4 years old.	1 Holstein heifer, 2 years old.
1 Ayrshire bull, 1½ years old.	2 Jersey cows.
2 Guernsey cows.	19 Grade Milch cows.
1 Guernsey heifer, 1½ years old.	5 Grade Ay. heifers, 1½ years old.
5 Ayrshire cows.	2 Ayrshire heifers, 10 months old.
1 Ayrshire heifer, 1½ years old.	1 Grade Ay. heifer, 10 months old.
2 Holstein cows.	

We have also at present on hand 20 grade Shorthorn steers, 3 years old on experiment, 10 grade steers 1 year old, and 10 steer calves, also on experiment. Total, 83.

EXPERIMENTS WITH COWS.

The experiment with a view to determine, whether a fairly good dairy herd, well fed and cared for, would leave a credit balance after paying for feed consumed, and receiving credit for product at current prices, was again continued.

The different feeds were charged at the following prices:—Wheat bran, \$20 per ton; pea meal, \$30 per ton; oats, \$28 per ton; oil cake, \$35 per ton, making an average price of mixed meal ration, as per proportion fed to cows, of 1¼ cents per pound. Roots at \$2 per ton, ensilage at \$2 per ton and hay at \$7 per ton.

The ration fed to cows in full milk in winter was, ensilage or roots, 50 lbs; meal, 10 lbs.; and hay, 10 lbs., making a cost of 21 cents per cow per day.

In summer months while milking they were charged \$2.50 per month.

When dry in winter they were charged \$3 per month, and when dry in summer \$1 per month.

Different quantities were fed to different cows according to their capacity to consume and produce.

They were kept in the stable from November 1, 1901, to June 1, 1902, except on occasional fine days, when they were allowed out in the yard.

They were fed, watered and milked twice each day, at as nearly regular intervals as possible and by the same persons.

The summer feed was practically all summer soiling crop, rye, clover, oats, pease and vetches grown together and sown at different times.

The milk of each cow was weighed at milking twice each day, and a careful record kept of the number of pounds given.

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The percentage of fat in the milk of each cow was determined by the Babcock milk tester, and the fat credited to the cows, on the basis that 85 pounds fat produces 100 pounds marketable butter.

The milk was sent to the Nappan dairy station, and the cows were credited with the butter produced at the prices paid to all patrons of that station, which averaged for the year 22²/₃ cents per pound, which after deducting 4 cents per pound for manufacturing butter and hauling milk leaves 18²/₃ cents per pound.

The skim-milk was fed to calves and pigs, and credited to the cows at the rate of 15 cents per 100 pounds.

The following table will show the results obtained during the year:—

Name.	Breed.	Days Milk- ing.	Milk.	Fat.	Butter.	Total Credit.	Total Cost.	Profit.
			Lbs.	p. c.	Lbs.	\$ cts.	\$ cts.	\$ cts.
Eva Rooker...	Holstein	290	10880	3·4	435·20	109 52	65 25	44 27
Molly	Ayrshire Grade	287	8782	3·9	402·93	100 10	65 37	34 73
Ilda Rooker.	Holstein	285	9430	3·4	377·20	94 92	62 38	32 54
Corie	Ayrshire Grade	272	8430	3·9	386·70	96 08	66 96	29 12
Carrie	Ayrshire Grade	275	6975	3·7	303·61	75 78	53 24	22 54
Lucy	"	325	8010	3·6	339·17	84 88	64 06	20 82
Jessie P.	"	221	6540	3·8	292·37	72 81	52 31	20 50
Aiton	"	300	7745	3·8	301·54	76 08	57 88	18 20
Rex's Maud	Guernsey	210	4960	4·9	285·92	69 76	53 18	16 58
Beatrice	Ayrshire	240	6560	3·6	277·83	69 53	53 31	16 22
Daisy	Ayrshire Grade	310	6450	3·8	288·35	71 80	56 03	15 77
Bell	"	240	5740	4·2	283·62	70 02	54 99	15 03
Annie	"	240	5675	4·2	280·41	69 22	54 46	14 76
Nellie	Guernsey	190	4840	4·7	267·62	65 50	50 75	14 75
Lady Lock	Ayrshire	225	5965	3·8	266·58	66 38	51 81	14 57
Louise	"	240	6200	3·6	262·84	65 69	52 69	13 00
Curly	Ay. Gn. Grade	210	5240	4·1	252·75	62 53	50 81	11 72
Sonsy	Ayrshire	280	5610	3·9	257·40	63 95	52 29	11 66
Mary	Jersey Grade.	210	5110	4·1	246·48	60 99	49 50	11 47
Ida B.	Ayrshire Grade	270	6010	3·7	261·61	65 30	54 18	11 12
Rose	Holstein Grade ...	210	5340	3·7	232·46	58 02	48 94	9 08
Yellow Kate	Ayrshire	240	5280	3·6	223·62	49 66	49 66	6 40

EXPERIMENTS WITH STEERS.

This experiment was again carried on with a view to testing the advisability of dehorning full grown steers at the commencement of their feeding period, whether fed in loose boxes or tied in stalls.

Twelve 3-year old steers were used for this test, in 3 lots of 4 each, of as nearly as possible, equal form, fatness and weight (shorthorn grades).

All weights were taken after a fast of 14 hours, i.e., at 9 a. m. without feed.

The horns were taken off lots 1 and 2 and left on lot 3.

By careful weighing both before and after dehorning, it was found that about two weeks were required to regain the loss in weight from dehorning. The average loss was about 25 lbs. per steer.

All lots were fed alike as nearly as possible from start to finish of test, and kept in the stable all the time, except on occasional fine days, when they were let out for a time, averaging not more than once a week.

The feeds were charged at the following prices: Hay, \$7 per ton; roots, \$2 per ton; ensilage, \$2 per ton; mixed meals averaged \$25 per ton as per proportion fed.

RECORD of steers, fed from December 1, 1901, to April 30, 1902.

LOT I.—DEHORNED, FED IN LOOSE BOX.

Numbers.	Dec. 1.	Dec. 31.	Gain.	Jan. 30.	Gain.	Mar. 1.	Gain.	Mar. 31.	Gain.	Apr. 30.	Gain.	Total Gain.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
9.....	1,250	1,340	90	1,400	60	1,480	80	1,555	75	1,600	45	350
10.....	1,195	1,290	95	1,380	90	1,445	65	1,535	90	1,575	40	380
11.....	1,170	1,245	75	1,315	70	1,390	75	1,455	65	1,490	35	320
12.....	1,185	1,270	85	1,360	90	1,440	80	1,515	75	1,560	45	375
	4,800	5,145	345	5,455	310	5,755	300	6,060	305	6,225	165	1,425

LOT II.—DEHORNED, TIED IN STALLS.

5.....	1,120	1,200	80	1,270	70	1,320	50	1,390	70	1,430	40	310
6.....	1,145	1,235	90	1,305	70	1,365	60	1,445	80	1,485	40	340
7.....	1,130	1,200	70	1,260	60	1,310	50	1,355	45	1,395	40	266
8.....	1,095	1,200	105	1,280	80	1,335	55	1,395	60	1,430	35	335
	4,490	4,835	345	5,115	280	5,330	215	5,585	255	5,740	155	1,250

LOT III.—NOT DEHORNED, TIED IN STALLS.

1.....	1,240	1,330	90	1,400	70	1,460	60	1,525	65	1,570	45	330
2.....	1,205	1,260	55	1,320	60	1,390	70	1,465	75	1,510	45	305
3.....	1,105	1,190	85	1,255	65	1,320	65	1,400	80	1,440	40	335
4.....	1,160	1,220	60	1,280	60	1,330	50	1,405	75	1,450	45	290
	4,710	5,000	290	5,255	255	5,500	245	5,795	295	5,970	175	1,260

STEERS—EXPERIMENT II.

With a view to determine the advisability of putting in heavy or light steers to feed, eight steers were put in box-stalls in 2 lots of 4 each, of about equal form and fatness, weighing respectively 4,800 and 4,000 pounds. The results are as follows, after feeding the animals alike :—

LOT I.—HEAVY STEERS.

Numbers.	Dec. 1.	Dec. 31.	Gain.	Jan. 30.	Gain.	Mar. 1.	Gain.	Mar. 31.	Gain.	Apr. 30.	Gain.	Total Gain.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
17.....	1,250	1,340	90	1,400	60	1,480	80	1,555	75	1,600	45	350
18.....	1,195	1,290	95	1,380	90	1,445	65	1,535	90	1,575	40	380
19.....	1,170	1,245	75	1,315	70	1,390	75	1,455	65	1,490	35	320
20.....	1,185	1,270	85	1,360	90	1,440	80	1,515	75	1,560	45	375
	4,800	5,145	345	5,455	310	5,755	300	6,060	305	6,225	165	1,425

LOT II.—LIGHT STEERS.

13.....	1,020	1,100	80	1,170	70	1,250	80	1,315	65	1,355	40	335
14.....	960	1,045	85	1,100	65	1,200	90	1,265	65	1,315	50	355
15.....	1,010	1,095	85	1,160	65	1,245	85	1,315	70	1,360	45	350
16.....	1,010	1,096	85	1,165	70	1,235	70	1,300	65	1,345	45	335
	4,000	4,335	335	4,605	270	4,930	325	5,195	265	5,375	180	1,375

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COMMENTS ON EXPERIMENT II.

Original weight of 4 heavy steers 4,800 at 4c. per lb.....	\$192 00
Weight at finish of 4 heavy steers, 6,225 lbs. at 6½c per lb.....	381 28
Balance.....	189 28
Cost of feed for lot, 150 days.....	105 84
Profit on lot.....	83 44
Original weight of 4 light steers, 4,000 lbs. at 4c. per lb.....	\$ 160 00
Weight at finish of 4 light steers. 5,375 lbs. at 6½c. per lb.....	329 22
Balance..	169 22
Cost of feed for lot, 150 days....	105 84
Profit on lot.....	63 38

Making a difference in favour of heavy steers of \$5.01 per steer.

Provided gains of each lot had been equal, then balance would still be \$4.25, which would seem to justify paying a higher price per pound for the heavier steers when putting in to feed.

COST OF 1 STEER PER DAY FOR ENTIRE PERIOD.

Period.	Daily Ration.	Daily cost.	Cost for period.	—
1901.		\$ cts.	\$ cts.	\$ cts.
Dec. to Dec. 31.....	Roots, 90 lbs.. Meal, 3 " Hay, 10 "	0 09 0 03½ 0 03½	2 70 1 12½ 1 05	
1902.				4 87½
Dec. 31 to Jan. 30....	Roots, 60 lbs... .. Meal, 5 " Hay, 10 "	0 06 0 06½ 0 03½	1 80 1 87½ 1 05	
				4 72½
Jan. 30 to Mar. 1..	Roots, 40 lbs..... Meal, 7 " Hay, 12 "	0 04 0 08¾ 0 04½	1 20 2 62½ 1 26	
				5 08½
Mar. 1 to Mar. 31.....	Roots, 30 lbs..... Meal, 9 " Hay, 15 "	0 03 0 11¼ 0 05¼	0 90 3 37½ 1 57½	
				5 85
Mar. 31 to April 30.....	Ensilage, 20 lbs Meal, 10 " Hay, 15 "	0 02 0 12½ 0 05¼	0 60 3 75 1 57½	
				5 92½
Cost of feed of 1 steer.....				26 46
" 16 steers.....				423 36

Original weight of 16 steers, 18,000 lbs. at 4c. per lb.....	\$ 720 00
Weight at finish of 16 steers, 23,310 lbs. at 6½c. per lb....	1,427 72
Balance.....	707 73
Cost of feed for lot, 150 days.....	423 36
Net profit.....	284 37
Daily rate of grain per steer....	Lbs. 2·21
Cost of 1 lb. gain.....	Cts. 7·97
" feed per day per steer.....	" 17·64
Profit per steer.....	\$ 17 77

CONTINUATION OF STEER CALF EXPERIMENT.

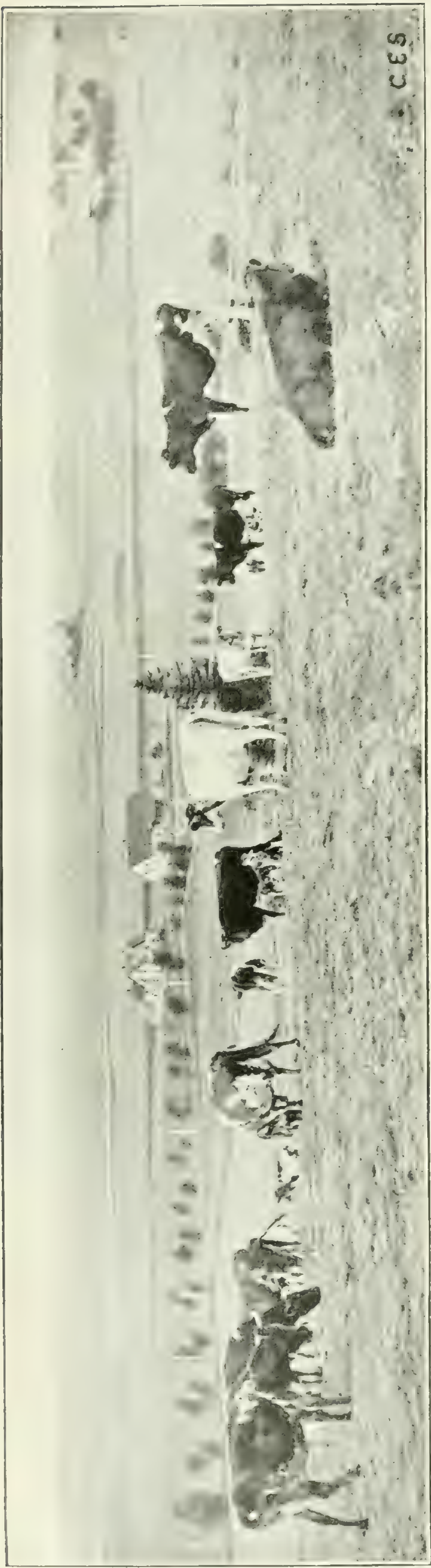
This experiment, with a view to determine the comparative economy of feeding calves a full fattening ration from the start, as contrasted with a limited growing ration, begun last year with 12 steer-calves, in two lots of six each, was continued, but owing to the death of one calf in the full-fattening lot, early in the year, it was thought best to reduce both lots and continue the experiment with 10 calves. Last year's experiment is being repeated with 10 steer calves termed 'calves of May 1902, Exp. II.'

In estimating the cost of feeding calves the following values were placed on the different feeds :—

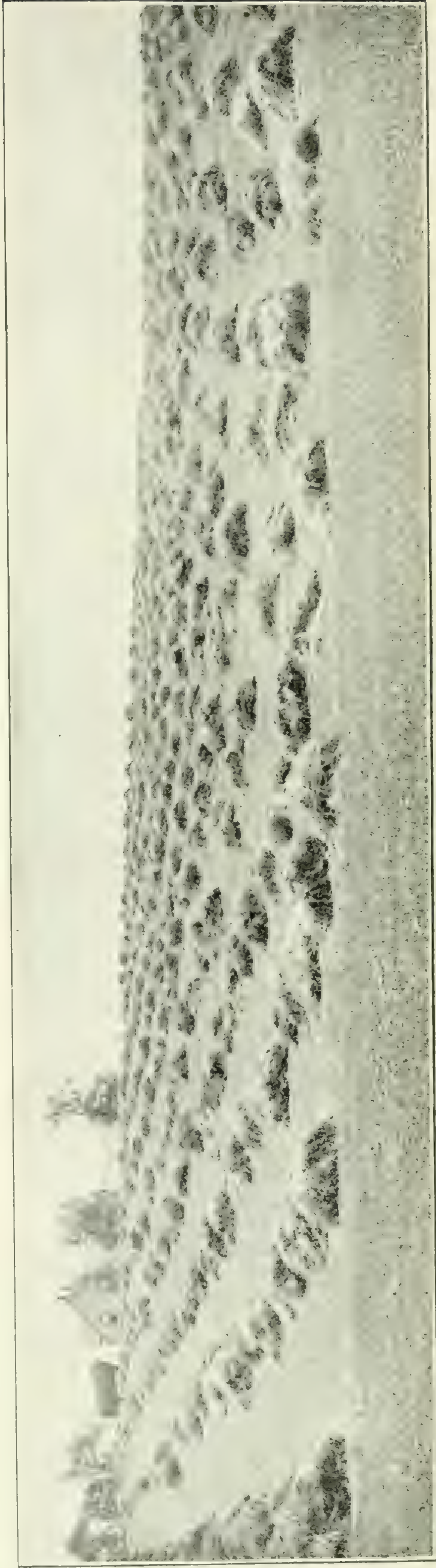
- New milk, \$1.00 per 100 lbs.
Skim-milk, 15 cts. per 100 lbs.
Wheat bran, \$1.00 per 100 "
Crushed oats, \$1.40 per 100 lbs.
- Oil-cake, \$1.75 per 100 lbs.
Roots or Ensilage, 10 cts. per 100 lbs.
Hay, \$7.00 per ton.
Straw, \$3.00 per ton.

FULL FATTENING RATIONS—EXPERIMENT I.—CALVES OF MAY, 1901.

Period.	Daily Rations per Steer.	Amount Fed during Period.	Cost.	—
		Lbs.	\$ cts.	\$ cts.
Dec. 1, 1901 to Jan. 1, 1902.	Roots, 15 lbs..... Meal, 2 lbs..... Hay, 2½ lbs.....	2,325 310 387½	2 32½ 3 87½ 1 35¾	7 55¾
Jan. 1 to Feb. 1.....	Roots, 20 lbs..... Meal, 2 lbs..... Hay, 2½ lbs.....	3,100 310 387½	3 10 3 87½ 1 35¾	8 33¼
Feb. 1 to Mar. 1.....	Roots, 25 lbs..... Meal, 3 lbs..... Hay, 2½ lbs.....	3,500 420 350	3 50 5 25 1 22½	9 97½
Mar. 1 to April 1.....	Roots, 30 lbs..... Meal, 3 lbs..... Hay, 2½ lbs.....	4,550 465 387½	4 65 5 81¼ 1 35¾	11 82
April 1 to May 1....	Roots, 30 lbs..... Meal, 3 lbs..... Hay, 4 lbs....	4,500 450 600	4 50 5 62½ 2 10	12 22½
May 1 to June 1.....	Roots, 30 lbs..... Meal, 3 lbs..... Hay, 4 lbs.....	4,650 465 620	4 65 5 81¼ 2 17	12 63¼
June 1 to July 1.....	Roots, 30 lbs..... Meal, 3 lbs..... Hay, 5 lbs.....	4,500 450 750	4 50 5 62½ 2 62½	12 75
July 1 to Aug. 1.....	Green feed, 40 lbs..... Meal, 2 lbs.....	6,200 310	6 20 3 87½	10 07½
Aug. 1 to Sept. 1.....	Pastured on rape at \$1 per month..... Meal, 2 lbs.....	..... 310	5 00 3 87½	8 87½
Sept. 1 to Oct. 1.....	Pastured on rape at \$1 per month..... Meal, 2 lbs.....	..... 300	5 00 3 75	8 75
Oct. 1 to Nov. 1..	Pasture at \$1 per month.....	.....	5 00	5 00
Nov. 1 to Dec. 1.....	Roots, 40 lbs..... Meal, 3 lbs..... Hay, 5 lbs.....	6,000 450 750	6 00 5 62½ 2 62½	14 25
	Cost of feed for 5 steers, 365 days....	.....	.....	122 24¼



CATTLE AT PASTURE, EXPERIMENTAL FARM, NAPPAN, N.S.



FIELD OF UPLAND HAY, EXPERIMENTAL FARM, NAPPAN, N.S. YIELD, 3 TONS, 360 LBS. PER ACRE.

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FULL FATTENING RATION.

Period.	Weight at Start.	Weight at Finish.	Gain.
	Lbs.	Lbs.	Lbs.
Dec. 1, 1901 to Jan. 1, 1902.....	2,450	2,660	210
Jan. 1 to Feb. 1.....	2,660	2,825	165
Feb. 1 to Mar. 1.....	2,825	3,000	175
Mar. 1 to April 1.....	3,000	3,190	190
April 1 to May 1.....	3,190	3,360	170
May 1 to June 1.....	3,360	3,580	220
June 1 to July 1.....	3,580	3,815	235
July 1 to Aug. 1.....	3,815	4,000	195
Aug. 1 to Sept. 1.....	4,000	Pasture.	
Sept. 1 to Oct. 1.....	Pasture.	"	
Oct. 1 to Nov. 1.....	"	4,400	400
Nov. 1 to Dec. 1.....	4,400	4,620	220

Total gain Dec. 1, 1901 to Dec. 1, 1902.....	Lbs.	2,170
Weight at start.....	"	2,450
Weight at finish.....	"	4,620
Daily rate of gain per steer.....	"	1.13
Cost of 1 lb. gain.....	cts.	5.63
Cost of feed per day per steer.....		6.46
Cost of lot 1 year.....	\$	122 24

LIMITED GROWING RATION.—EXPERIMENT I.—CALVES OF MAY, 1901.

Period.	Daily Ration.	Amount Fed during Period.	Cost.	—
		Lbs.	\$ cts.	\$ cts.
Dec. 1, 1901, to Jan. 1, 1902.	Roots, 15 lbs.....	2,325	2 32½	
	Meal, 1 lb.....	155	1 55	
	Straw, 2½ lbs.....	387½	0 58½	
				4 46
Jan. 1 to Feb. 1...	Roots, 20 lbs..	3,100	3 10	
	Meal, ½ lb.....	77½	0 77½	
	Straw, 5 lbs...	775	1 16¼	
				5 03¾
Feb. 1 to Mar. 1.....	Roots, 25 lbs.....	3,500	3 50	
	Meal, ½ lb.....	70	0 70	
	Hay, 2½ lbs.....	350	1 22½	
				5 42½
Mar. 1 to April 1.....	Roots, 30 lbs.....	4,650	4 65	
	Meal, ½ lb.....	77½	0 77½	
	Hay, 2½ lbs.....	387½	1 35¾	
				6 78¼
April 1 to May 1.....	Roots, 30 lbs.....	4,500	4 50	
	Meal, ½ lb..	75	0 75	
	Hay, 2½ lbs.....	375	1 31½	
				6 56½
May 1 to June 1.....	Roots, 30 lbs.....	4,650	4 65	
	Hay, 4 lbs.....	620	2 17	
				6 82
June 1 to Nov. 1.....	At pasture, at 75c. p. m. p. steer.....		18 75	18 75
Nov. 1 to Dec. 1.....	Roots, 40 lbs..	6,000	6 00	
	Straw, 5 lbs.....	750	1 12½	
				7 12½
	Cost of feed for 5 steers for 365 days.....			60 96

LIMITED GROWING RATION.

Period.	Weight at Start.	Weight at Finish.	Gain.
	Lbs.	Lbs.	Lbs.
Dec. 1, 1901, to Jan 1, 1902.....	1,960	2,100	140
Jan. 1 to Feb. 1.....	2,100	2,210	110
Feb. 1 to March 1.....	2,210	2,330	120
March 1 to April 1.....	2,330	2,500	170
April 1 to May 1.....	2,500	2,630	130
May 1 to June 1.....	2,630	2,800	170
June 1 to Nov. 1.....	2,800	3,315	515
Nov. 1 to Dec. 1.....	3,315	3,485	170

Total gain Dec. 1, 1901, to Dec. 1, 1902 Lbs. 1,525
 Weight at start..... " 1,960
 Weight at finish..... " 3,485

Daily rate of gain per steer..... Lbs. .83
 Cost of 1 lb. gain..... cts. 3.99
 " feed per day per steer..... " 3.25
 " lot for year..... \$60 96

FULL FATTENING RATION—EXPERIMENT II—CALVES OF MAY, 1902.

Period 1902.	Daily Ration per Calf.	Amount Fed during Period.	Cost.	Total Cost.
		Lbs.	\$ cts.	\$ cts.
May 16 to June 1.....	10 lbs. whole milk.....	750	7 50	
	10 lbs. skim-milk.....	750	1 12½	
				8 62½
June 1 to July 1.....	10 lbs. whole milk.....	1,500	15 00	
	10 lbs. skim-milk.....	1,500	2 25	
	¼ lb. bran and oil cake.....	37½	0 37½	
				17 62½
July 1 to Aug. 1.....	8 lbs. whole milk.....	1,240	12 40	
	12 lbs. skim-milk.....	1,860	2 79	
	½ lb. bran and oil cake.....	77½	0 77½	
				15 96½
Aug. 1 to Sept. 1.....	20 lbs. skim-milk.....	3,100	4 65	
	1 lb. crushed oats.....	155	2 17	
	½ lb. bran and oil cake.....	77½	0 77½	
	2 lbs. hay.....	310	1 34	
				8 93½
Sept. 1 to Oct. 1.....	10 lbs. skim-milk..	1,500	2 25	
	1 lb. crushed oats.....	150	2 08	
	½ lb. bran and oil cake.....	75	0 75	
	2 lbs. hay.....	300	1 20	
				6 28
Oct. 1 to Nov. 1.....	10 lbs. roots.....	1,550	1 55	
	1 lb. crushed oats ..	155	2 17	
	1 lb. bran and oil cake.....	155	1 55	
	2 lbs. hay....	310	1 34	
				6 61
Nov. 1 to Dec. 1.....	10 lbs. roots.....	1,500	1 50	
	1½ lbs. crushed oats ..	225	3 12	
	1 lb. bran and oil cake..	150	1 50	
	2 lbs. hay.....	300	1 20	
				7 32
	Cost of feed for 5 calves 198 days.....			71 36

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FULL FATTENING RATION—CALVES, 1902.

Period 1902.	Weight at Start.	Weight at Finish.	Gain.
	Lbs.	Lbs.	Lbs.
May 16 to June 1.....	955	1,075	120
June 1 to July 1.....	1,075	1,360	285
July 1 to Aug. 1.....	1,360	1,600	240
Aug. 1 to Sept. 1.....	1,600	1,830	230
Sept. 1 to Oct. 1.....	1,830	2,100	270
Oct. 1 to Nov. 1.....	2,100	2,305	205
Nov. 1 to Dec. 1.....	2,305	2,580	275

Total gain May 16 to Dec. 1.....	Lbs.	1,625
Weight at start.....	"	955
Weight at finish.....	"	2,580
Daily rate of gain per steer.....	"	1.64
Cost of 1 lb. gain.....	cts.	4.38
Cost of feed per day per steer.....	"	7.20
Cost of feed for lot for 198 days.....	\$	71 36

LIMITED GROWING RATION—EXPERIMENT II—CALVES OF MAY 1902.

Period 1902.	Daily Ration per Calf.	Amount Fed during Period.	Cost.	Total Cost.
		Lbs.	\$ cts.	\$ cts.
May 16 to June 1.....	8 lbs. whole milk..... 12 lbs. skim-milk.....	600 900	6 00 1 35	7 35
June 1 to July 1.....	20 lbs. skim-milk..... ¼ lb. bran and oil cake.....	3,000 37½	4 50 0 37½	4 87½
July 1 to Aug. 1.....	20 lbs. skim-milk..... ¼ lb. bran and oil cake.....	3,100 38¾	4 65 0 38¾	5 03¾
Aug. 1 to Sept. 1.....	20 lbs. skim-milk..... ¼ lb. bran and oil cake..... 2 lbs. hay.....	3,100 38¾ 310	4 65 0 38¾ 1 34	6 37¾
Sept. 1 to Oct. 1.....	10 lbs. skim milk..... ½ lb. bran and oil cake..... 2 lbs. hay.....	1,500 75 300	2 25 0 75 1 20	4 20
Oct. 1 to Nov. 1.....	2 lbs. roots..... ½ lb. bran and oil cake..... 2 lbs. hay.....	775 77½ 310	0 77½ 0 77½ 1 34	2 89
Nov. 1 to Dec. 1.....	10 lbs. roots..... ½ lb. bran and oil cake..... 2 lbs. hay.....	1,500 75 300	1 50 0 75 1 20	3 45
	Cost of feed of 5 steers for 198 days.....			34 18

LIMITED GROWING RATION—CALVES 1902.

Period 1902.	Weight at Start.	Weight at Finish.	Gain.
	Lbs.	Lbs.	Lbs.
May 16 to June 1.....	605	725	120
June 1 to July 1.....	725	925	200
July 1 to Aug. 1.....	925	1,135	210
Aug. 1 to Sept. 1.....	1,135	1,330	195
Sept. 1 to Oct. 1.....	1,330	1,525	195
Oct. 1 to Nov. 1.....	1,525	1,710	185
Nov. 1 to Dec. 1.....	1,710	1,945	235

Total gain May 16 to Dec. 1.....	Lbs.	1,340
Weight at start.....	"	605
Weight at finish	"	1,945
Daily rate of gain per steer.....	"	1·35
Cost of 1 lb. gain.....	cts.	2·55
Cost of feed per day per steer.....	"	3·45
Cost of feed for lot, 198 days.....	\$	34 18

PIGS.

The herd at present consists of Yorkshires, Berkshires, Tamworths and their crosses, in all 52 head, as follows :—

- 1 Yorkshire boar, registered.
- 2 Yorkshire sows, registered.
- 1 Berkshire boar, registered.
- 2 Berkshire sows, registered.
- 1 Tamworth sow, registered.
- 3 grade brood sows.
- 40 grade pigs from one to four months old.

EXPERIMENTS WITH SWINE.

FEEDING IN PASTURE *versus* FEEDING IN PENS.

Unfortunately the pasture available for this test was quite poor, and until some further experiments are made no conclusion can be drawn.

The pigs were put into the test at from 2 to 4 months old, in 2 lots of 10 each, on July 1. They were fed on a ration of 3 lbs. buckwheat, shorts and wheat bran and 5 lbs. skim-milk. The results are as follows :—

FEEDING IN PENS.

No.	Breed.	Weight at Start.	Weight at Finish.	Net gain.	Number of Days fed.	Daily gain
		Lbs.	Lbs.	Lbs.		Lbs.
1	Yorkshire (D) Berkshire (S).....	58	161	103	85	1·21
2	" "	53	160	107	85	1·25
3	" "	49	163	114	85	1·34
4	Yorkshire-Tamworth (D) Berkshire (S)	49	171	122	102	1·01
5	" " "	48	181	133	102	1·10
6	" " "	44	172	128	102	1·06
7	Chester (D) Yorkshire (S).....	38	168	130	120	1·09
8	" "	35	177	142	120	1·19
9	" "	34	158	124	120	1·04
10	Berkshire	40	191	151	120	1·26

FEEDING IN PASTURE.

1	Yorkshire (D) Berkshire (S).	70	172	102	85	1·20
2	" "	68	168	100	85	1·18
3	" "	65	161	96	85	1·13
4	Yorkshire-Tamworth (D) Berkshire (S)	45	177	132	102	1·29
5	" " "	40	169	129	102	1·26
6	" " "	44	177	132	102	1·30
7	Chester (D) Berkshire (S)	29	179	150	120	1·25
8	" "	31	180	149	120	1·24
9	" "	37	185	148	120	1·23
10	Berkshire	35	180	145	120	1·30

SHEEP.

The flock on the farm at present consists of :—

- 1 Pure bred Leicester ram.
- 5 Pure bred Leicester ewes.
- 5 Pure bred Shropshire ewes.
- 2 Pure bred Shropshire ewe lambs.
- 4 Grade Shropshire ewes.

POULTRY.

Four varieties were kept this year. Barred Plymouth Rocks, Black Minorcas, White Leghorns and White Wyandottes. The pens were made up as follows :—

- Barred Plymouth Rocks, 7 hens and 1 cock.
- Black Minorcas, 4 hens and 1 cock.
- White Leghorns, 6 hens and 1 cock.
- White Wyandottes, 2 hens and 1 cock.

During the winter season the hens were fed a corn-meal mash in the morning and whole grain in the afternoon. Green bones and crushed oyster shells were occasionally given and free access to water and dust bath.

The eggs laid during the year by the different breeds were :—

Barred Plymouth Rocks.....	277
White Leghorns.....	401
Black Minorcas.....	151
White Wyandottes.....	120

The incubator (Willetts) was used again this year but with very poor results.

The number of eggs in each hatch and percentage of chickens hatched was as follows :

1st hatch, March 4, 100 eggs. Not fertile, 47. Died in shell, 26. Chickens hatched, 27.

2nd hatch, March 26, 120 eggs. Not fertile, 45. Died in shell, 43. Chickens hatched, 32.

3rd hatch, April 21, 120 eggs. Not fertile, 32. Died in shell, 33. Chickens hatched, 55.

April 21, set Barred Plymouth Rock hen on 13 eggs from Montreal. Not fertile, 2. Died in shell, 6. Hatched, 5.

May 3, set White Leghorn hen on 13 eggs from Montreal. Not fertile, 5. Died in shell, 1. Hatched, 7.

Whether hatching with the incubator or the hen the same results were obtained, i.e., a large percentage of the chicks died at the pipping stage, especially was this the case in the earlier hatches.

BEES.

I have to report poor success with bees this year. Four colonies were put on their summer stands on April 15, 1902. Two swarms were captured during July and two were lost.

No honey was extracted during the summer and the colonies were put in the cellar, their winter quarters, weighing respectively 40, 33, 28, 31, 35 and 37 pounds.

I have the honour to be, sir,

Your obedient servant,

R. ROBERTSON,

Superintendent.

REPORT OF THE HORTICULTURIST.

(W. S. BLAIR.)

NAPPAN, N.S., December 1, 1902.

To DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith a report of some of the work done in the horticultural department of the Experimental Farm for the maritime provinces for the year 1902.

April was a fine open month giving indications of an early spring. This, however, was offset by a cool May with several heavy frosts. The last, and most severe, was on the 19th of 8°, and 21st of 6°. Generally speaking May was cool and dry, and June cool and wet. The spring being backward made early growth with both fruits and vegetables slow, and the continued cool weather made the season unfavourable for those vegetables that require a good amount of heat. The daily average highest and lowest temperatures for the months of May, June, July, August and September, 1902, as compared with those of 1901 and 1900, were as follows :—

	Maximum.			Minimum.		
	1902.	1901,	1900.	1902.	1901.	1900.
May.....	57·7°	55·3°	55·9°	37·6°	40·9°	36·3°
June.....	64·3°	69·8°	68·°	44·7°	48·9°	46 1°
July.....	72·6°	76·4°	75·°	50·9°	54·1°	54·°
August.....	73·°	75·7°	71·8°	53·9°	54·9°	52·4°
September...	68·4°	68·2°	65·4°	46·6°	48·7°	41·4°

It will be seen from the foregoing that particularly the months of July, August and June were much cooler than usual. The average daily lowest temperature for May was 40·9° in 1901 and 37·6° in 1902, with a daily highest temperature of 57·7° in 1902 and 55·3° in 1901. Therefore, it will be seen that on the average May was about equal with other years in respect to temperature. The average highest daily temperature, for the months of June, July and August were 69·9° in 1902 ; 73·9° in 1901, and 71·6 in 1900. The average lowest daily temperatures for these three months were 52·6° in 1902 ; 49·8° in 1901 and 50·8° in 1900. It will, therefore be seen that the past season had for these three months a daily highest average of 4° less heat than 1901, and a daily average lowest temperature of 3° less than 1901. This indicates a continuance of cooler weather than usual, which was particularly noticeable in its effect on certain crops. The first frost was on Sept. 26, when 29° F. was registered. The next was on Oct. 5 of 29°.

2-3 EDWARD VII., A. 1903

The apple crop in Nova Scotia is this season much below the average, both as to yield and quality. Taking the whole province the yield is estimated at less than one-half of an average crop. The weather being cool and damp at the time of blossoming no doubt largely accounts for this light crop. The influence of such conditions has been much more marked in some sections than in others, and consequently the distribution of fruit is irregular. The almost continuous wet cool weather during spraying time is accountable for more apple scab fungus than usual, and the light crop of fruit instead of being of a higher grade, as one would naturally expect, is much below the average.

Fruit trees generally have made good growth this year. The apple crop at Nappan was exceptionally good, especially did the fall varieties do well. The plum crop was only fair. The cherry crop was a complete failure here. The frost of the 19th and 21st of May killed the blossoms which were about out. In neighbouring districts where this frost did not strike so heavily, and where trees came into bloom later a fair crop of cherries was obtained.

The strawberry crop was good, due very largely to seasonable showers at the time of ripening. The raspberry, and gooseberry crops were only fair. Black currants were a poor crop, and red and white currants a good crop.

The shrubs which are year by year becoming more interesting and attractive made splendid advancement this season.

The collection of annual flowering plants, and perennials, made the best show this year that we have ever had. The show of sweet peas and dahlias was especially good.

Experiments were again carried on with vegetables of various kinds, a summary of some of these experiments is given in this report.

Information is also submitted on the work done in testing different varieties of cherries, and a descriptive list is given of those which have so far done the best.

Space has also been given to some of those varieties of apples, and plums that promise to be useful for more general culture.

I beg to acknowledge the following donations:—N. E. Jack, Esq., Chateauguay Basin, P.Q. Fameuse, and McIntosh Red, scions; A. H. Johnson, Esq., Wolfville, N.S. Pryor's Red apple, and 'October' plum scions.

APPLE ORCHARD.

The apple orchard has made splendid growth this season, and a fair amount of good fruit was obtained. The many Russian sorts which are proving of little value in orchard No. 1. are being top grafted with new varieties. Orchard No. 2. which has the advantage of protection from heavy winds by a belt of spruce trees, and has also a lighter soil, is making splendid progress, and gave some good fruit this year. The following descriptive list embraces those apples which up to the present time are the most vigorous and productive and which are likely to be of commercial value for many sections of the maritime provinces.

MCINTOSH RED.

Three trees of this variety were planted in the spring of 1890. They have made only fair growth. The soil in which they are growing is a heavy clay loam, with a very heavy clay subsoil running to within eight or ten inches of the surface. This soil does not seem to be adapted to apples of the Fameuse group, and as this apple is one of that class the results obtained here do not give a fair idea of its general value in the maritime provinces. Excellent specimens of McIntosh Red have been grown in the St. John river valley, and in other parts of this province on naturally drained sandy soils. This fruit may probably succeed well on the lighter soils on farms in central New Brunswick.

The fruit of this variety grown here has not matured perfectly, due, no doubt, to the heavy cold soil. The fruit is liable to scab if not sprayed, but it is not so bad in

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this respect as the Fameuse. It has not been so heavy or so early a bearer as the Fameuse, but the fruit is much larger. The tree has a spreading open growth. This is an excellent apple for either home use or local markets. It is shipped from Montreal to the English market, as a high grade dessert apple, packed in bushel boxes.

The following is a description of McIntosh Red as given by Waugh: 'Fruit round, oblate, slightly irregular; size medium large; cavity variable, sloping, nearly regular; stem usually short; basin medium deep, rather abrupt; calyx small, tightly closed; colour nearly even dark rich wine red, shading to light pinkish crimson in the shade; dots many; bloom heavy and conspicuous; skin tough; flesh snow white with crimson shadings; core medium; flavour subacid; aromatic; quality, good about like Fameuse; season December and January.' It originated on the McIntosh homestead in Matilda township, Ontario, and was first distributed about thirty years ago. It is now grown in many states of the Union, being specially adapted to the requirements of the fancy fruit trade in the larger cities.

CANADA BALDWIN.

Three trees of this variety were planted in 1890. They fruited in 1894 and have borne heavy and light crops on alternate years ever since. This fruit is said to belong to the Fameuse group. It is not liable to scab, and is an abundant bearer. The fruit is not large, and on this account is not likely to take a prominent place commercially. It is, however, of special value for central New Brunswick, where excellent specimens have been grown. This fruit does not develop properly here, due to the extremely heavy soil. The following is a description of this fruit by Waugh: 'Fruit oblate; size medium; cavity deep, flaring; stem long, slender; basin medium deep, smooth; calyx medium, closed; colour dull, dark red, striped and washed over a light greenish yellow ground; dots several white, bloom moderately heavy; skin tough; flesh white with much red, tender; core medium; flavour subacid, with Fameuse aroma, juicy; quality good; season December and January; tree thrifty and hardy.'

ONTARIO.

Two trees of this variety were planted in the spring of 1890 in orchard No. 1. In the No. 2 orchard, which is protected with a shelter belt of spruce trees, one tree was planted in the spring of 1897. The two trees in orchard No. 1, which is a much heavier clay loam than orchard No. 2, and not at all protected, have made from poor to fair growth. The tree in orchard No. 2 has made good growth. This variety fruits early. The two trees planted in 1890 fruited lightly in 1894, and the one planted in 1897 fruited this season. It gives a good crop of handsome, well formed, even sized fruit of good quality for the table, and excellent for cooking. The tree has a rather spreading head, is vigorous and hardy. This is a desirable winter sort for either home use or market. The fruit ships well and has been sent from Ontario to the British market and realized as good prices as the Spy. This apple is medium to large, oblate, frequently angular, and slightly conical; cavity broad, deep, irregular; basin deep, slightly corrugated; calyx small; skin firm and close in texture; colour whitish yellow with a red check and covered by bright bloom, with a few dots. The flesh is whitish yellow, juicy, tender, a brisk, sub-acid, fine grained, slightly aromatic, quality good. Season January to April. This fruit should be handled very carefully as it shows bruises readily. It was originated by the late Charles Arnold, of Paris, Ont., by crossing Wagener with Spy.

CANADA RED.

Trees of this variety were planted in 1890. The tree has made fairly strong growth. Specimens that I have seen growing on a lighter soil than that at Nappan were more healthy and vigorous. The fruit is medium in size, but it is an abundant bearer, and comes into fruiting early. It is a good dessert or cooking apple, and ships well to foreign

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markets. This fruit is well adapted to localities where the Baldwin does not succeed. It should prove of value, both in Prince Edward Island and New Brunswick. As far as it has been tested it has given good results in these provinces. The fruit is medium, roundish, slightly conical, regular; colour greenish yellow, almost covered with red, sometimes splashed or slightly striped with darker red, having numerous large prominent greenish dots; stem medium in a small deep and often russeted cavity; calyx closed, small, in a slightly corrugated basin. The flesh is greenish white, fine grained, firm, moderately juicy; mild, sub-acid, flavour fair. Season December to April. Its origin is unknown.

YORK IMPERIAL.

One tree of this variety was planted in the protected orchard in 1897. It has made good growth, and fruited this year for the first time. It had a peck of excellent fruit which coloured up well. This is a good variety and should be more largely grown. The fruit always brings a top price on the market, and it is an excellent shipper. The apple is medium to large, oblong, angular, oblique, smooth; colour striped somewhat and splashed with red over nearly the whole surface with a yellowish ground, thinly sprinkled with light and gray dots; basin deep, wide; calyx closed or partially opened; cavity not deep, narrow, russeted slightly; stem short. Season January to April.

JONATHAN.

Two trees were planted in the orchard here in 1890. They are fairly vigorous growers, and have fruited heavily for the past three years. The fruit is not large, but matures well. The tree is a great fruiter, and if not thinned the branches are liable to break with the abundant crop. If allowed to bear heavily the fruit is small; judicious thinning is necessary for best results. The fruit is of excellent quality, and makes a good dessert apple. It stands shipment well. This apple is worthy of more attention by orchardists in the maritime provinces and should be of special value for central New Brunswick as it is very hardy. The fruit is of medium size, roundish, conical; skin smooth, clear light yellow, nearly covered with bright red, shaded into rich dark red in the sun, some light yellow dots. The flesh is white, rarely a little stained with red near the surface, very tender, juicy, of a mild sprightly, subacid character with a vinous flavour; quality good, season December to March. It originated at Kingston, N.Y.

NORTH-WESTERN GREENING.

Two trees of this variety were planted in the protected orchard in 1897. These have made exceptionally thrifty growth. The trees have a well formed upright open head. They fruited this season for the first time, and over a bushel of fine extra large even sized fruit was obtained. The wood of the tree seems to be rather weak, and many of the branches were broken from the weight of fruit which should have been easily carried by trees of their size. The tree is an early bearer, and is reported as a continuous fruiter. The fruit is large to very large, round, smooth, yellowish green, very attractive. The flesh is greenish white, fine grained, inclined to be dry, mild, pleasant sub-acid and aromatic. Season December to April. This apple is a good shipper, and is grown largely in some parts of the United States as a late winter apple. It is very hardy and vigorous, and should prove of value in many parts of the eastern provinces.

GRIMES' GOLDEN.

In the spring of 1890 three trees were planted in orchard No. 1, and in 1892 one tree was planted in orchard No. 2. The tree in the protected orchard has far outstripped those in the heavier soiled unprotected orchard. They have, however, all made good growth. They have fruited heavily the past four years. This tree can carry an

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abundant crop of fruit, which is distributed evenly over the whole tree. The head has rather a spreading but compact habit. The wood is exceedingly tough, and will stand a crop that many others would break under. The fruit is of exceptionally good quality. It is not large, and on account of its colour and size is not likely to be valuable for foreign markets. It has a place for local consumption, and should be grown by every farmer for his own use. Excellent specimens of this fruit have been grown in central New Brunswick. The fruit is roundish oblate, slightly conical, medium; colour rich golden yellow, sprinkled moderately with small gray and light dots; cavity rather deep and sometimes slightly russeted; calyx partially open, or closed; basin abrupt, uneven; flesh yellowish, crisp, tender, juicy, rich, fine grained, spicy sub-acid, with a peculiar aroma. Season December to February.

HURLBUT.

Two trees of this variety were planted in the spring of 1897. One of these has made very strong growth the other only fair growth. They fruited this season for the first time, one tree produced a bushel and the other one-half bushel of excellent fruit. The tree is said to be an early and abundant bearer on alternate years. It has a spreading open growth, and the wood is exceedingly tough, and will bear up well under a large crop of fruit. This fruit promises to become a leading early winter sort for market. It is medium to large, oblate, slightly conic, angular; skin yellow, shaded with red striped and splashed with darker red and thinly sprinkled with light dots. Stalk short, inserted in a broad rather shallow cavity, slightly russeted; calyx, closed; basin, shallow. Flesh white, crisp, tender, juicy, mild, sprightly sub-acid. Good to very good. Season December to February.

GANO.

Two trees of this variety were planted in 1897. They have made very strong growth. The tree is a much more upright and regular grower with us than the Ben Davis, which variety the Gano resembles except that the fruit is much darker in colour. The fruit ripens much better here than the Ben Davis does. Generally speaking, it far surpasses the Ben Davis grown in the orchard here. The trees do better and produce a better quality of fruit which would seem to indicate that the Gano is better adapted to a heavy soil than Ben Davis. These trees fruited this season for the first time, and produced three pecks of splendid looking fruit from each tree. It has qualities equal to the Ben Davis for shipment, and in general appearance and quality outside of its colour resembles the Ben Davis from which it is said to be a sport. It is probable that in the future it may largely take the place of Ben Davis. The fruit is round, conical; skin, green at first but entirely covered with dark red when matured. Flesh greenish white, quite juicy, firm, quality fair. Season February to May.

CHERRY ORCHARD.

Forty varieties of cherries are now growing in the experimental orchard. These are, with few exceptions, all making good growth, but unfortunately every year some trees die. This loss is confined largely to the sweet varieties, which, after coming into bearing will die one branch after another until the tree has to be removed. Only from one to three trees of a variety are under test, and the fondness of birds for sweet cherries makes it difficult to get enough ripened fruit for comparative test. Sour varieties of cherries will succeed on a heavier soil than the sweet ones, which like a naturally dry, light, loamy soil. The soil of the cherry orchard which is underdrained, is a clay loam with a very heavy clay subsoil, and probably better success would have been obtained had it been possible to have a lighter soil for this fruit.

The heavy frost of May 19, which caught the sweet cherries just coming into bloom killed the blossoms completely and no fruit was obtained. The sour cherry blossoms

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were also largely killed. This frost was sectional and many sour cherry trees in surrounding districts gave a good crop.

The following list will we trust serve a useful purpose in pointing out those varieties best adapted to the maritime provinces. From our experience and observation sweet cherries should be left off the list as profitable sorts for New Brunswick, Prince Edward Island and many sections of Nova Scotia.

Prunus avium and *Prunus cerasus* are the two European species of cherries from which probably all cultivated cherries have originated. Those which have sprung from *Prunus avium* are known by their tall erect growth. The bark is glossy and of a reddish brown colour. The flowers which are borne on lateral spurs generally in clusters appear with the limp, gradually taper pointed leaves. The flesh of the fruit is soft or firm according to the variety. The fruit is yellow, black or red; spherical, heart shaped or pointed and generally sweet. Those from *Prunus cerasus* generally termed the sour cherries are low headed with spreading branches. The flowers, which appear before the stiff, rather abruptly pointed light or grayish green leaves are borne in clusters from lateral buds.

The following classification by Bailey will be found useful to fix different types of this fruit in the mind. Owing to the number of new varieties being constantly introduced, the distinctive lines dividing some of these groups are becoming less marked and intermediate forms between the upright and spreading sorts are numerous.

Prunus avium has four representatives in America :—

I.—The Mazzards or inferior seedlings; fruit of various shapes and colours; common along roadsides. In the middle Atlantic States, the Mazzard trees often attain great age and size.

II.—The Hearts or heart-shaped, soft, sweet cherries, light or dark, represented by Governor Wood and Black Tartarian.

III.—The bigarreaus or heart-shaped, firm-fleshed, sweet cherries like the varieties Napoleon and Windsor.

IV.—The Dukes; light-coloured, somewhat acid flesh, such as May Duke and Reine Hortense.

From *Prunus cerasus* two classes have sprung :—

I.—The Amarells or light-coloured, sour cherries with colourless juice, represented by Montmorency and Early Richmond.

II.—The Morellos or dark-coloured, sour cherries with dark coloured juice like the English Morello and Louis Philippe.

The Mazzard and Mahaleb cherries are used almost entirely as stock for root grafting. The Mahaleb also of European origin is thought to be hardier, but is smaller and has a dwarfing tendency. It is better adapted to clay soils.

The American wild Red or Bird cherry *Prunus Pennsylvanicum* is also used for root grafting. It is exceptionally hardy and is valuable for this purpose.

Of the Heart cherries the Governor Wood and Black Tartarian are the most successful of those tested here. The former is light yellow shaded and marbled with red. The fruit is nearly sweet, rather tender and of excellent quality. The fruit is ripe soon after the first of July. The tree has fruited well here but after a few years fruiting has died out. The Black Tartarian has very dark red or black fruit, with dark purplish flesh, sweet and very juicy. The fruit is ripe early in July. This is certainly one of the finest cherries which has fruited here, but it is not a heavy bearer, and has seldom lived here more than five or six years.

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Of the Bigarreau's the variety Windsor has done the best. It has proven hardier than any of the other sweet cherries. The fruit is mottled dark red, firm, juicy, with pinkish white flesh. It has not borne heavily here, although it is said to be an abundant bearer. It is ripe after the first week in July. This cherry will probably give the best satisfaction of any of the sweet varieties. Napoleon, also of this group, ripens its fruit earlier. It has a light lemon yellow colour with a reddish cheek. The flesh is colourless and very firm. It has not been so vigorous and hardy here as Governor Wood.

From trees of the Duke class we have so far not had any fruit. The trees have not done as well as those of the Bigarreau type.

The Montmorency, Early Richmond and some of the Russian sorts are the best of the Amarelle class.

The Montmorency is probably one of the best of this group. The fruit is bright red, with nearly colourless flesh, moderately sour. The tree is vigorous and productive, ripening its fruit about the last of July.

The Early Richmond is more vigorous than Montmorency but has not proven fruitful here. Trees of this variety are found in almost every part of the provinces and prove in the most of cases to be good bearers. The fruit is bright red, somewhat smaller than Montmorency. The flesh is soft, juicy, and of a rather pleasant flavour when fully ripe. The fruit ripens before Montmorency. The pit adheres to the stalk more firmly than in any other variety.

Of the Russian sorts Spate Amarelle, or Early Amarelle, and Vladimir are the best of those grown here. These are very hardy and will succeed where the above varieties will not.

Spate Amarelle is dark red, with flesh somewhat reddened, juicy and fairly good in quality. It is a strong grower and productive. Vladimir is a strong grower, but has not, so far, been productive here. It is said not to bear well on a clay soil, and probably a lighter soil would remedy this trouble. The fruit is very dark red, quite firm and somewhat acid.

The English Morello and Ostheim are two varieties of the Morello group that have given good satisfaction. The English Morello is not a large growing tree, but is very productive. It does especially well in Prince Edward Island. The fruit is about two weeks later in ripening than Montmorency. When fully ripe the fruit is very dark red, with dark purplish crimson flesh and of a rich flavour, with a slight astringency. The tree has not such an upright head as Montmorency and is more drooping and open.

Ostheim has dark red fruit, dark flesh and juice, with a mild acid character, nearly sweet when fully ripe. The tree is not a large grower, is productive, and considerably like the English Morello, but is more upright. The fruit ripens with the Montmorency.

The Montmorency, English Morello, Ostheim and Early Richmond will probably suit a larger area, and give more satisfaction than any of the other varieties that have so far fruited here.

PLUM ORCHARD.

Seventy varieties of plums are now growing here. Many of these are making only fair growth. One row of plums has been set in orchard No. 2 and these seem to do much better, having protection which plum trees need. The following varieties are those which have fruited and are doing the best here so far. These have all sprung from the European plum *Prunus domestica*. They are grouped according to the classification given by Waugh.

The Diamond Type.—These varieties are characterized by having fruit mostly large, oval, very slightly compressed sideways, dark blue, with heavy blue bloom, flesh generally yellow, very firm and usually clinging to the stone. Such sorts as Moore's Arctic, St. Lawrence, Shipper's Pride and Quackenboss come into this group. They are mostly of inferior quality, but productive, firm fleshed and good shippers.

MOORE'S ARCTIC.

Two trees of this variety were planted in 1892. They have made good growth and have fruited heavily since 1896. This is one of the hardiest of the domestica plums, and is one of the most productive of all the plums fruited here. The fruit is rather below medium, roundish, oval; cavity slight; stem medium, rather slender; suture, indistinct; colour purplish black, with a thin blue bloom; flesh yellowish, juicy, tender, very firm, pleasant flavour but not rich. Fit for market the middle of September.

The Reine Claude or Green Gage group.—This group has the following characteristics:—Foliage usually large, leaves broad and rather flat, with very coarse serrations; fruit nearly spherical, in a few varieties slightly elongated, green or tardily turning to a dull, creamy yellow, occasionally with a faint pink blush; flesh rather firm, green, clinging to the stone, or partially free in a few varieties. Such varieties as Imperial Gage, Prince's Yellow Gage, Bryanston's Gage, Washington, Green Gage and Reine Claude de Bavay, come under this group.

REINE CLAUDE DE BAVAY.

Two trees were planted in 1891. One has made very strong growth and one only fair. This is one of the finest of the Gage plums. It is much later than Imperial Gage or Prince's Yellow Gage, and on this account is much grown, as it can be placed upon the market after many of the other plums are gone. These trees have fruited well, giving the first crop in 1898. The fruit is round, oval; colour greenish yellow, thin bloom, with small violet coloured longitudinal veins; stalk short and stout set in small cavity; suture medium; flesh quite firm, yellow, juicy, with a sugary, rich, excellent flavour, adhering slightly to stone, quality good. Ripens here after October 1. The tree is upright, with a somewhat spreading habit. The fruit is medium sized. This variety is recommended for more general culture.

WASHINGTON.

Two trees of this variety were planted in 1891. They are strong, upright growers, very vigorous and fairly productive. They have borne regular crops of fruit since 1898. This is an excellent, early, large, plum, ripening here early in September. It is grown quite extensively for commercial purposes, but with some is said not to be very productive. The fruit is large, nearly round; cavity quite wide, shallow; stem short; suture shallow; colour greenish yellow, often with a pale red blush; dots several, greenish; bloom white; flesh yellow, free from stone, rather firm, sweet, mild, moderately rich; quality good.

IMPERIAL GAGE.

Two trees of this variety were planted in 1891. These have made strong growth and fruited abundantly since 1899. The fruit is medium sized, round-oval; cavity shallow, broad, flaring; stem an inch long; suture shallow; colour yellowish green; dots green; bloom whitish; skin tough; flesh greenish yellow, quite free from stone; quality good to best. Ripens here about the middle of September.

PRINCE'S YELLOW GAGE.

Three trees of this variety were planted in 1891. These have made exceptionally strong and vigorous growth and have fruited abundantly. This seems to have more vigour than the Imperial Gage, and, has fruited more abundantly. The fruit is medium

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sized round-oval ; cavity broad shallow ; stem stout ; suture a line ; colour golden yellow, a little clouded, bloom white, heavy ; flesh deep yellow, stone free ; flavour rich, sugary, quality very good. Ripens here soon after the first of September.

BRYANSTON'S GAGE.

Two trees of this variety were planted in 1897, have made strong growth and have fruited this season. The fruit is of medium size, roundish ; colour dull greenish yellow, with a darker shading in the sun ; flesh yellow clinging to stone. The quality is good. It is a late plum about the season of Reine Claude de Bavay, and does not appear superior in any way.

The Dame Aubert group.—The characters of this group are summarized as follows :—‘Large growing trees, with large foliage ; fruit very large oval, with more or less of a neck ; yellow greenish yellow, or purplish ; flesh yellow. This includes our largest plums, perhaps excepting one or two hybrids.’ In this group are Coe's Golden Drop, Grand Duke and Yellow Egg or Magnum Bonum.

COE'S GOLDEN DROP.

Two trees of this variety were planted in 1891. These have not made very good growth, but have fruited well since 1898. The fruit is very large, oval, with a short neck, the two halves unequal ; suture deep ; cavity very shallow and abrupt ; stem stout, medium in length ; apex somewhat depressed ; colour golden yellow, dots very many, yellow ; bloom yellow ; flesh firm adhering partly to stone ; quality good. Ripens here towards the last of September. This is a good commercial variety and should prove valuable in this province. It is sometimes called the Silver Prune.

The Prune group.—The group characters which may be assigned to the prunes are as follows :—‘Trees and foliage, various ; fruit mostly medium to large, always oval or ellipsoid, usually with one side of the oval straighter than the other ; compressed ; colour, blue or purple ; flesh mostly greenish yellow, rather firm ; stone usually free in a large cavity.’ The varieties belonging to this group and generally known in this province are Fellenburg or Italian Prune, German Prune and Czar.

FELLENBERG.

Two trees of this variety were planted in 1893. They have made the most vigorous growth of any plum trees in the orchard, and have borne a large crop of fruit the past two seasons. The tree has a spreading but compact habit. The fruit is borne evenly over the whole tree, which can carry a large crop. To look at the tree, only a small crop would be expected, but its even distribution of large specimens makes this one of the best yielding plums we have. This plum never sets so much fruit as to make thinning necessary. It is a variety well known throughout America and 80 per cent of the prunes grown on the Pacific coast are said to be of this sort. The fruit is large, elliptical, straighter on one side and longer on the other, cavity very shallow ; stem nearly as long as the fruit ; suture shallow ; colour dark blue ; dots not many, dull yellow ; bloom blue ; skin thin ; flesh greenish yellow ; stone medium sized, and free from the flesh ; quality good to extra. Ripens here about the first of October. This is considered an exceptionally good market plum on account of its lateness and good shipping qualities.

GERMAN PRUNE.

Three trees of this variety were planted in 1892. They have made good growth, and are quite productive. They have fruited since 1899. The crop has not been as large as the Italian Prune, nor is the tree so vigorous. The quality of the fruit is not equal to the Italian Prune, nor is it as large. The fruit is above medium, long, oval, cavity very shallow, stem rather slender, medium in length; suture hardly more than a line, apex somewhat pointed; colour blue; with a few scattered dots; bloom blue; flesh greenish yellow, free from stone; stone small, quality fair. Ripens the last of September. This plum is largely grown in Germany, and also extensively planted in America.

The Bradshaw type.—‘Plums of this type are characterized by having large, slightly obovate fruit which is purplish, and has distinct pinkish dots. They also have a thin skin, and a comparatively soft, juicy flesh.’ In this class are Victoria, Pond’s Seedling, Field and Bradshaw. We have not fruited Victoria and Bradshaw, but the trees are making splendid growth. These two varieties do well in Prince Edward Island.

POND’S SEEDLING.

Two trees of this variety were planted in 1892. They have not made strong growth and have not fruited much. The fruit is very large; obovate, with a short neck; cavity narrow and shallow; colour violet or purple; dots numerous, brownish; flesh yellow, juicy; skin thick; quality good.

The Lombard group.—‘Probably the thinnest distinction of all is to be made betwixt the Bradshaw and the Lombard type. They differ, however, from having fruit generally smaller, more regularly oval, very slightly compressed sideways, pinkish-purple or purplish.’ Varieties common to us are Prince of Wales and Lombard. The Prince of Wales is making good growth here but has so far not fruited. It does not appear to have as much vigour as the Lombard.

LOMBARD.

Three trees of this variety were planted in 1891. They have made fairly good growth, and have fruited well since 1897. The tree is an upright grower, but seems more susceptible to black knot here than any other variety, and is not being so largely planted now as formerly. The fruit is of medium size; oval, slightly flattened at the end; stem short; suture shallow; cavity medium deep; colour delicate purplish, or reddish violet; dots several, whitish; bloom blue; flesh yellow, firm, clinging to stone; skin thin, quality only fair. Ripens here the middle of September.

The following varieties were named by two prominent plum growers of this Province as the most profitable to plant for the present market, one suggested Burbank, Grand Duke, Magnum Bonum or Yellow Egg and German Prune, and the other, Bradshaw, Washington, Prince of Wales and Burbank.

STRAWBERRIES.

Forty-eight varieties were under test this season. The crop was a good one, due to the favourable weather at time of ripening. The following table gives the quantity obtained from each plot, and the time of picking. The yield of the same varieties for the years 1901, 1900 and 1899, is also given. The soil on which these were grown is a clay loam, which becomes very hard and compact after the first year. We follow the

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practice of taking but one crop off, and then plough up the plants. Generally speaking this will be found the most profitable plan to follow. The varieties found best here are Warfield, Beder Wood, Greenville, Bubach, Saunders, Parker Earle and Haverland. Several new varieties fruited this year for the first time.

STRAWBERRIES.

Name.	Sex.	Date of first picking.	Date of last picking.	Date of largest picking.	Fruit picked to July 22, 1902.	Fruit picked from July 22 to end of season.	Total fruit picked from plot of 99 sq. ft. in 1902.	Total fruit picked from plot of 99 sq. ft. in 1901.	Total fruit picked from plot of 99 sq. ft. in 1900.	Total fruit picked from plot of 99 sq. ft. in 1899.
					Lbs. oz.	Lbs. oz.	Lbs. oz.	Lbs. oz.	Lbs. oz.	Lbs. oz.
Afton.....	P	July 17.	July 28.	July 21.	12 15	5 1	18 ..	.. ..	.. ..	.. ..
Beder Wood.....	B	" 14.	" 28.	" 17.	23 ..	7 1	30 1	34 3	28 12	31 8½
Brandywine.....	B	" 14.	" 28.	" 24.	11 2	11 7	22 9	16 2	20 ..	11 9½
Buster.....	P	" 17.	" 31.	" 22.	12 10	8 14	21 8	.. ..	.. ..	.. ..
Bisel.....	P	" 14.	" 29.	" 21.	18 13	6 9	25 7	40 ..	28 13	32 7½
Beverly.....	B	" 21.	" 31.	" 26.	6 2	11 8	17 10	33 4	24 12	19 5½
Barton's.....	P	" 14.	" 28.	" 21.	20 8	9 8	30 ..	32 2	27 3	24 2½
Bubach.....	P	" 14.	" 31.	" 24.	9 ..	13 8	22 8	39 8	21 13	18 9
Chairs.....	B	" 17.	" 31.	" 21.	8 2	7 6	15 8	17 1	20 2	15 12
Cosette.....	P	" 14.	" 31.	" 21.	10 9	3 2	13 11	17 8	.. ..	.. ..
Clyde.....	B	" 14.	" 29.	" 21.	9 7	10 1	19 8	.. ..	.. ..	.. ..
Capt. Jack.....	P	" 14.	" 31.	" 21.	27 ..	5 8	32 8	32 4	31 8	17 5
Crescent.....	P	" 14.	" 28.	" 22.	29 12	9 8	39 4	32 ..	39 12	39 9
Daisy.....	P	" 14.	" 28.	" 21.	12 14	6 13	19 11	.. ..	.. ..	.. ..
Enhance.....	B	" 15.	" 31.	" 21.	10 6	16 14	27 4	23 13	22 6	13 9½
Equinox.....	B	" 14.	" 31.	" 26.	5 9	6 10	12 3	12 8	12 ..	17 4
Eureka.....	P	" 19.	" 31.	" 25.	3 9	11 2	14 11	25 8	19 5	21 13
Glen Mary.....	B	" 15.	" 31.	" 22.	11 3	10 15	22 2	.. ..	.. ..	.. ..
Greenville.....	P	" 15.	" 29.	" 21.	18 ..	6 8	24 8	42 ..	21 14	17 4
Gandy.....	B	" 14.	" 31.	" 21.	21 14	7 13	29 11	27 12	18 4	19 6
Haverland.....	P	" 14.	" 31.	" 21.	11 ..	17 1	28 1	34 10	22 9	22 8½
H. W. Beecher.....	B	" 14.	" 28.	" 21.	23 14	6 ..	29 14	31 8	29 3	37 3
Howard's No. 41....	P	" 17.	" 31.	" 22.	12 13	8 15	21 12	.. ..	.. ..	.. ..
Ida.....	P	" 14.	" 28.	" 21.	14 10	5 5	19 15	20 ..	.. ..	.. ..
Jessie.....	B	" 15.	" 28.	" 21.	13 4	6 12	20 ..	18 1	.. ..	.. ..
John Little.....	P	" 14.	" 28.	" 21.	32 7	7 3	39 10	28 2	24 14	22 3
Jas. Vick.....	B	" 15.	" 31.	" 24.	12 13	20 4	33 1	34 8	20 11	21 9
Lovett.....	B	" 14.	" 28.	" 21.	27 15	6 2	34 1	36 ..	28 ..	35 13
Mary.....	B	" 14.	" 31.	" 21.	12 1	8 3	20 4	17 8	17 4	22 4
Otsego.....	P	" 21.	" 31.	" 26.	6 9	8 13	15 6	28 1	18 5	14 6½
Pearl.....	P	" 14.	" 28.	" 17.	22 6	3 14	26 4	24 12	21 6	19 6
Paris King.....	B	" 14.	" 28.	" 17.	8 3	2 9	10 12	17 12	23 8	4 7½
Parker Earle.....	B	" 14.	" 28.	" 22.	12 14	4 1	16 15	31 1	37 15	21 5
Princess.....	P	" 14.	" 31.	" 21.	24 13	7 9	32 5	30 ..	.. ..	.. ..
Swindle.....	P	" 17.	" 31.	" 26.	10 9	19 3	29 12	28 12	19 4	28 8
Seneca Queen.....	B	" 17.	" 31.	" 21.	15 15	9 9	25 8	27 ..	24 10	17 14
Sharpless.....	B	" 14.	" 31.	" 21.	17 1	12 1	29 2	18 4	20 7	17 7
Shirts.....	P	" 17.	" 31.	" 26.	10 ..	14 14	24 14	16 14	14 1	15 2
Saunders.....	B	" 14.	" 21.	" 21.	17 8	14 13	32 5	35 8	.. ..	.. ..
Senator Dunlop.....	B	" 17.	" 28.	" 21.	11 1	6 2	17 3	.. ..	.. ..	.. ..
Thompson's Late....	P	" 14.	" 24.	" 14.	9 ..	2 1	11 1	14 14	14 1	9 15
Tennessee Prolific..	B	" 15.	" 31.	" 21.	14 14	13 2	28 ..	31 10	.. ..	.. ..
Wm. Belt.....	B	" 15.	" 31.	" 26.	13 8	10 11	24 3	25 12	8 10	14 4
Woolverton.....	B	" 14.	" 28.	" 21.	14 8	4 11	19 3	.. ..	37 3	21 14½
Wilson.....	B	" 14.	" 31.	" 21.	19 1	9 15	29 ..	31 4	20 10	21 4
Warfield.....	P	" 14.	" 28.	" 19.	22 ..	6 10	28 10	47 8	41 7	40 ..
Williams.....	B	" 16.	" 28.	" 21.	16 8	5 10	22 2	20 8	28 11	19 15½
1001.....	P	" 14.	" 31.	" 22.	12 9	8 2	20 11	22 4	.. ..	.. ..

GARDEN PEASE.

Eighty-five varieties of garden pease were grown this year. The soil was a clay loam, and the previous crop was strawberries. No manure was given. The pease were sown in rows 3 feet apart, and the seed dropped 1½ inches apart in the row. Each plot was one row 66 feet long. One-half of each plot was pulled when fit to use green, and the quantity of green pease with pods from that half plot noted. The other half was allowed to ripen seed. The following table gives ten of those varieties which we consider the best. The variety Alaska is one of the earliest green pease grown, and is perhaps the best early one. The three large peas King Edward VII, Prosperity and Gradus, are all good, coming in about the same time. King Edward VII a new English pea sent out by Haszard & Moore, Charlottetown, P.E.I., is in our opinion superior to either Prosperity or Gradus. The varieties Gradus and Prosperity are catalogued as one by many seedsmen, we have found Prosperity more productive than Gradus.

GARDEN PEASE—TEN OF THE BEST VARIETIES.

Name of Variety.	When planted.	First green pease picked.	Last green pease picked.	Total quantity of green pease from plot, 1902.	Total quantity of green pease from plot, 1901.	Total quantity of green pease from plot, 1900.	Length of vine.	Size of pod.	Character of pease.
				Lbs.	Lbs.	Lbs.	In.	Inches.	
Alaska	Apl. 25.	July 16.	July 26.	26½	30	13¼	28	2¼ to 2½	Medium, smooth, dark green.
Nott's Excelsior...	" 25.	" 22.	" 28.	23¼	26	29¼	18	2¼ " 2¾	Medium, wrinkled, green.
American Wonder.	" 25.	" 22.	" 29.	23½	42	20	16	2¼ " 2¾	" "
King Edward VII.	" 25.	" 22.	" 30.	24½	22½	.....	32	3 " 3½	Large, wrinkled, light green.
Prosperity.....	" 25.	" 23.	" 31.	20¾	22	...	30	2¾ " 3½	" "
Gradus.....	" 25.	" 23.	" 31.	19¼	16¾	12½	30	3 " 3½	" "
Dwarf Telephone.	" 25.	" 31.	Aug. 9.	32	44	32¾	20	3 " 3½	" "
Duke of Albany or American Cham- pion.....	" 25.	Aug. 1.	" 9.	37¼	53	36	36	3 " 3½	Large, wrinkled, green.
Heroine	" 25.	" 4.	" 12.	34	36	38½	34	3 " 3¾	" "
Stratagem... ..	" 25.	" 4.	" 12.	36½	.....	.....	32	2¾ " 3½	Large, wrinkled, light green.

GARDEN CORN.

Forty-eight varieties of garden corn were planted May 31 in hills 3 feet apart each way. The soil on which they were grown is a clay loam, and was previously in strawberries. Manure at the rate of 20 one-horse cart loads per acre was scattered broadcast over this in the spring and the ground ploughed and worked up. The corn was thinned to 4 stalks to a hill. The season was not favourable for corn, and many of the varieties did not mature before killed by frost.

The Golden Bantam is a variety of yellow corn, good for home use or special market. It is too small for the general market. It is certainly the most delicious of any corn tested. Fuller's Early Yellow is the earliest and best market variety of the other yellow sorts grown.

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The following varieties are probably the best for general market. They matured in the following order: Peep O'Day, and Beverly, are a few days earlier than Early Cory, but the ears are not large, and the plants are not large croppers. Extra Early Cory and Early Marblehead, Ford's Early Sugar, Early Fordhook, Crosby's Early Sugar, Fuller's Early Yellow, Canada Yellow, New Champion, and Metropolitan. A good selection for general planting is Beverly, Extra Early Cory, Crosby's Extra Early, Golden Bantam and New Champion.

EARLY POTATOES.

To test the relative value of some of the best early varieties of potatoes for early market purposes 18 different sorts were planted, in rows 24 inches apart, and one foot apart in the rows, on May 21, and dug August 12. The plots dug consisted each of 1 row 33 feet long. Eight of these varieties have been tested in this way for the past three years. The ground was fertilized with complete fertilizer at the rate of 400 lbs. per acre sown in the drills. The following results were obtained:—

EARLY POTATOES.

Name.	Dug Aug. 12, 1902.		Dug Aug. 19, 1901.		Dug Aug. 10, 1900.		Remarks.
	Marketable.	Unmarketable.	Marketable.	Unmarketable.	Marketable.	Unmarketable.	
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	
Early Sunrise.....	20 $\frac{1}{4}$	2	20 $\frac{3}{4}$	5 $\frac{1}{2}$	33	9	Good, pink.
Early Gem.....	26	4 $\frac{1}{2}$	17 $\frac{1}{2}$	7 $\frac{1}{2}$	..	..	Pink, good.
Burpee's Extra Early.....	17 $\frac{1}{4}$	7 $\frac{1}{4}$	18 $\frac{1}{2}$	5 $\frac{1}{2}$	28 $\frac{1}{2}$	4 $\frac{1}{2}$	Good, pink and white.
Pearce's Extra Early.....	32 $\frac{1}{4}$	5 $\frac{1}{2}$	21	4	27	4 $\frac{1}{2}$	Good, pink and white.
Early Ohio.....	28	4	16 $\frac{1}{2}$	7	30	9	Good, pink.
Crown Jewel.....	34	5	24 $\frac{1}{2}$	4	42	8 $\frac{1}{2}$	Good, pink and white.
Bovee.....	29 $\frac{3}{4}$	6 $\frac{1}{2}$	19	6	36	12	Good, pink and white.
Irish Cobbler.....	28	5 $\frac{1}{2}$	24	6	40 $\frac{1}{2}$	6	White, good.
Canadian Beauty.....	18	3	.....	.....	.....	.....	Pink and white, good.
Early Harvest.....	23 $\frac{1}{4}$	2 $\frac{1}{2}$	.....	.....	.....	.....	Good, white.
Early Andes.....	26	4 $\frac{1}{2}$	.....	.....	.....	.....	Pink, good.
Earliest of all.....	30	6	.....	.....	.....	.....	Pink and white, good.
Reeve's Rose.....	28	4	.....	.....	.....	.....	Good, pink.
Early Michigan.....	36	2	.....	.....	.....	.....	Good, white.
Beauty of Hebron.....	22	3 $\frac{1}{4}$	.....	.....	.....	.....	Pink and white, good.
Rawdon Rose.....	21 $\frac{1}{2}$	2	.....	.....	.....	.....	Good, pink and white.
Early Rose.....	30 $\frac{1}{4}$	3	.....	.....	.....	.....	Good, pink.
Early Norther.....	38	3 $\frac{1}{4}$	.....	.....	.....	.....	Good, pink.

ONIONS.

Twenty varieties of onions were tested under similar conditions. The seed of thes was sown in the hot-bed April 3, and the plants were planted in the open ground on May 6. The ground into which they were transplanted was a rich loam, the same as that on which the onions were grown the previous season. It was ploughed in the spring, disc and smooth harrowed, after which 200 lbs. of complete fertilizer per acre was sown broadcast and harrowed in with the smoothing harrow. The plants were set

16—18 $\frac{1}{2}$

on the level ground in rows one foot apart and 3 inches apart in the rows. They were put in $\frac{3}{4}$ of an inch deep. The yield in the following table is from one row 66 feet long. They matured in the order given :—

ONIONS—TEST OF VARIETIES.

Name.	Pounds matured from plot.	Remarks.
Barletta.....	47	White, small, round, matured well.
Paris Silverskin.....	49	White, small, flat, matured well.
White Dutch.....	37	White, small, flat, matured well.
Paris Silver King.....	93	White, large, flat, matured well.
Extra Early Pearl.....	64	White, medium, flat, matured well.
Express.....	61	Yellow, medium, round, matured well.
Extra Early Red Seal.....	48	Medium, did not come true.
Extra Early Gold Seal.....	44	Medium, did not come true.
Australian Brown.....	53	Brownish, medium to large, round, matured well.
Southport Yellow Globe.....	84	Yellow, large, globe, matured well.
Wethersfield Large Red.....	59	Red, large, flat, matured fairly well.
Southport White Globe.....	75	White, large, globe, matured fairly well.
Pink Prizetaker.....	59	Not all true pink, large, globe, matured fairly well.
Prizetaker.....	62	Yellow, large, globe, matured fairly well.
Market Favourite Keeping.....	52	Large, globe, matured fairly well.
Gigantic Gibraltar.....	96	Yellowish, large, globe, matured fairly well.
Danver's Yellow Globe.....	56	Yellow, large, globe, matured fairly well.
Straw-colored White Spanish.....	52	Yellow, large, matured fairly well.
Spanish King.....	22	Yellow, large, did not mature well.
James' Keeping.....	26	Large, did not mature well.

TOMATOES.

Eighty varieties of tomatoes were planted this season. They were started in the hot-bed on March 25, and transplanted one plant to a strawberry box of earth, April 15. These were allowed to grow in these boxes until put out in the open ground June 9. The plants were removed from the boxes by cutting them, and set with the earth attached 4 feet apart each way. The ground was in a fair state of cultivation and no manure or fertilizer was used. On June 28 a tablespoonfull of nitrate of soda was scattered around each plant.

These plots made fair growth, but owing to the cool weather only in a few cases did fruit ripen. The following sorts ripened some fruit and matured in the order named,—Atlantic Prize, South Jersey Quick-sure, Spark's Earliana, Earliest, Earliest of All, Early Leader, Extra Early, Advance, Early Ruby, Brinton's Best, Early Minnesota and Fordhook First.

VEGETABLES FOR THE GARDEN.

The following list has been found the most desirable varieties for general use :—

Pease.—Early, Alaska, Medium, Prosperity, Late, Heroine.

Beans.—Early, Golden Wax, Medium, Extra Early Valentine, Late, Keeney's Rustless Wax.

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Corn.—Extra Early, Beverly, Early Cory, Early Marblehead.

Cabbage.—Jersey Wakefield, Early Spring, Large Late Drumhead.

Cauliflower.—Early Dwarf Erfurt.

Onions.—Barletta, Australian Brown.

Carrots.—Chantenay.

Cucumbers.—White Spine, Boston Pickling.

Beets.—Eclipse.

Celery.—White Plume.

Tomatoes.—Atlantic Prize, Earliest of All.

Parsnips.—Hollow Crown.

Squash.—Bay State, Hubbard.

I have the honour, to be, sir,

Your obedient servant,

W. S. BLAIR,

Horticulturist.

EXPERIMENTAL FARM FOR MANITOBA.

REPORT OF S. A. BEDFORD, SUPERINTENDENT.

BRANDON, MAN., November 30, 1902.

TO DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith my fifteenth annual report, with details of experiments undertaken and work accomplished on the Brandon Experimental Farm during the past year.

The past winter was milder than usual and practically free of storms. From March 14 to 17, however, we experienced one of the worst blizzards ever known here, the wind blowing for many hours at the rate of sixty miles per hour. This was accompanied by a very heavy fall of wet snow which piled up into unusually high banks, and the thawing of this quantity of water-saturated snow, later in the season, did much towards retarding spring seeding.

April was a very backward month, the mean temperature being much below the average.

The weather during May was cloudy and cool and the rainfall excessive, but there was a total absence of injurious frosts. June set in with a deluge of rain on the first of the month, four inches falling on the Experimental Farm, in the space of forty minutes. The effect of such a deluge was to sweep away all loose soil from hilly fields into the hollows. Roads were almost destroyed, and deep water furrows cut on all sloping land. The balance of June was cloudy and the rainfall excessive.

These two months of exceptional rainfall raised the Assiniboine much above the usual level, flooding the valley and destroying the crop in its course. Fortunately the larger portion of the uniform test plots were sown on the higher portions of the farm and escaped injury. The rotation plots and quite a number of other interesting experiments were, however, destroyed, and will have to be taken up again in future years.

July was warm, the early rains had filled the soil with moisture, and growth was unusually rapid, so much so that weeds were crowded out and the heads of grain filled better than usual. Summer fallows on strong and moist land lodged badly, but the grain filled better than was expected, and in spite of the late spring, harvest was only a few days later than usual. Hired help was very difficult to procure throughout the summer and thousands of acres of wheat in this province lay unstooked for weeks for want of harvest hands. Fortunately the weather during harvest and threshing was nearly perfect, otherwise the loss would have been great.

Without doubt the past season has been the most satisfactory one, from an agricultural standpoint, ever experienced in the province, although few districts report abnormal returns. In nearly all portions of the province the yield of all kinds of grain was above the average, and the sample is generally an excellent one.

All the uniform test plots of wheat on the Experimental Farm, with one exception, escaped injury and the returns both in quantity and quality were all that could be desired. The different experiments with Speltz wheat were examined with interest during the summer, and numerous letters are being received from farmers seeking information regarding this newly introduced grain. Flax culture is also receiving increased attention throughout the province and in view of this, experiments with this crop have been extended. Several new varieties have been tried and a test of the suitability of a flax crop on new breaking has also been made.

Farmers supplied, in former years, with pure bred swine from this farm have been requested to express an opinion on them, and, in this year's report will be found extracts from their letters.

The fine crop of crab apples (*Pyrus baccata*) grown on the farm this year was very gratifying, and encourages us to hope that in the near future crab apples may be grown extensively in all parts of the province.

EXPERIMENTS WITH SPRING WHEAT.

On the Experimental Farm the yield of wheat on the uniform test plots was generally above the average, but some of the larger fields were injured by the flood. As usual the varieties least subject to rust were the most productive. It is evident that this disease is one of the chief factors in reducing the yield of wheat, especially during seasons of abundant rainfall, such as we have had the last two years.

The noticeable productiveness of Goose and Roumanian varieties of wheat can no doubt be largely attributed to their freedom from rust. Speltz wheat is also very free from this disease, which fact no doubt accounts for the palatableness of its straw. Apparently the injury from wheat smut is largely decreasing. There was very little last year, and this year not a trace could be found on the farm, either among the treated or untreated grain.

Owing to the very favourable harvest weather, and absence of frost, the wheat on this farm was unusually bright and plump.

Seventy-one varieties of spring wheat were tested this year. These were sown from the first to the sixth of May on black loam in plots of one-twentieth of an acre each.

SPRING WHEAT—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.		Yield per Acre.	Weight per Bushel.	Rusted.
							Lbs.	Bush.			
			In.		In.			Lbs.		Lbs.	
Roumanian	Aug. 31	117	48	Weak	2 $\frac{1}{2}$	Bearded..	6,075	46	20	65	None.
Goose.....	" 31	118	53	"	2 $\frac{1}{2}$	" ..	6,665	44	40	64	"
Campbell's White Chaff	" 29	121	53	Stiff	3 $\frac{1}{2}$	Beardless.	7,800	37	40	61	Slightly.
Countess	" 30	121	48	"	3	" ..	7,600	37	20	60	Badly.
Australian No. 10.	" 30	121	53	"	3	" ..	7,200	36	40	60	"
White Fife	" 30	121	52	"	3 $\frac{1}{2}$	" ..	7,600	35	20	60	Slightly.
Clyde	" 29	121	55	"	4	" ..	6,660	35	10	60	"
Speltz.....	" 27	113	41	"	2	Bearded..	3,990	34	40	42	None.
Monarch	" 27	119	55	"	4	Beardless.	6,660	34	40	60	Slightly.
Dawn.....	" 25	117	45	Fair.....	3 $\frac{1}{2}$	" ..	7,310	34	20	60	"
Benton.....	" 27	114	45	Stiff.....	3	" ..	6,125	34	..	61	"
Herrisson Bearded.....	" 27	113	47	Weak	2 $\frac{1}{2}$	Bearded..	5,400	34	..	61	"
Chester.....	" 26	113	48	Stiff.....	3	Beardless.	5,250	33	50	60	"
Admiral.....	" 27	119	50	"	4	" ..	6,660	33	50	60	"
Crown.....	" 26	113	47	"	3	Bearded..	5,920	33	40	60	"
White Russian.	" 30	122	50	"	4	Beardless.	7,000	33	20	59	"
Laurel.....	" 30	122	50	"	4	" ..	6,670	32	40	59	"
Captor	" 27	119	40	"	3 $\frac{1}{2}$	" ..	7,905	32	30	60	"
Mason.....	" 25	117	48	"	3 $\frac{1}{2}$	" ..	5,600	32	30	61	"
Robin's Rust Proof....	" 28	119	53	"	3	" ..	7,200	32	20	60	"
Minnesota 149.....	" 28	119	53	"	4	" ..	6,800	32	..	60	"
White Connell.....	" 27	119	50	"	4	" ..	5,950	32	..	60	"
Red Fern	" 26	112	45	"	3	Bearded..	4,760	32	..	61	"
Angus.	" 27	114	50	"	3 $\frac{1}{2}$	Beardless.	5,280	31	40	60	None.
Stanley	" 27	119	47	"	2 $\frac{1}{2}$	" ..	6,355	31	20	60	Considerably
Rideau.....	" 28	120	44	"	3	" ..	6,460	31	10	60	Slightly.
Cartier.....	" 24	111	41	Fair.....	3	Bearded..	4,495	31	..	60	"
Dion's.....	" 28	115	55	Weak	4	" ..	4,840	31	..	62	"
Dufferin.....	" 26	113	51	Fair.....	3 $\frac{1}{2}$	" ..	6,400	31	..	60	"
Red Fife	" 28	120	49	Stiff.....	3 $\frac{1}{2}$	Beardless.	6,300	31	..	60	"
Minnesota 169.....	" 28	119	53	"	4	" ..	5,920	30	50	59	"
Australian No. 13	" 27	114	49	"	4	" ..	5,950	30	40	58	"
Colorado.....	" 26	113	44	"	3	Bearded..	5,700	30	20	60	"
Hastings	" 26	113	47	Fair.....	3	Beardless.	5,610	30	20	61	"
Australian No. 9.....	" 27	114	50	Stiff.....	3 $\frac{1}{2}$	" ..	5,280	30	20	60	"

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SPRING WHEAT—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.	Rusted.
			In.		In.		Lbs.	Bush. Lbs.	Lbs.	
Blenheim.....	Aug. 27	114	51	Stiff.....	4	Bearded..	5,775	30 20	58	Slightly.
Blair.....	" 26	113	42	Weak.....	3	Beardless.	4,290	30 ..	61	"
Wellman's Fife.....	" 28	115	53	Stiff.....	3½	" ..	5,280	30 ..	60	"
Rio Grande.....	" 27	114	50	" ..	3½	Bearded..	5,075	29 50	61	"
Alpha.....	" 28	120	48	" ..	3½	Beardless.	5,336	29 40	60	"
Minnesota 163.....	" 30	117	49	" ..	4	" ..	6,970	29 40	59	Badly.
Percy.....	" 20	112	50	" ..	3½	" ..	6,435	29 20	59	Slightly.
Progress.....	" 27	119	40	" ..	3½	" ..	6,270	29 10	60	"
Red Swedish.....	" 30	117	51	Fair.....	3½	Bearded..	5,850	28 40	60	Badly.
Early Riga.....	" 18	110	45	Weak.....	3½	Beardless.	5,120	28 20	59	Slightly.
Norval.....	" 25	111	43	" ..	3	Bearded..	4,510	28 20	61	"
Advance.....	" 27	113	42	Fair.....	3	" ..	4,440	28 20	61	"
Cassell.....	" 28	115	52	Stiff.....	4	Beardless.	5,950	28 20	60	"
Essex.....	" 28	115	50	" ..	3½	" ..	5,125	27 50	60	"
Australian No. 19.....	" 29	120	48	" ..	3	" ..	6,045	27 40	60	Badly.
Blue Stem.....	" 30	122	53	" ..	3½	" ..	6,600	27 40	58	"
Beaudry.....	" 26	113	47	Weak.....	3	Bearded..	6,045	27 20	62	Slightly.
Crawford.....	" 25	116	51	" ..	3½	Beardless.	4,960	27 ..	60	"
Ladoga.....	" 22	109	48	Fair.....	3½	Bearded..	4,945	26 40	60	"
Australian No. 27.....	" 26	116	51	Stiff.....	4	Beardless.	5,760	26 20	60	Badly.
Bishop.....	" 25	112	47	Weak.....	3	" ..	4,060	25 40	60	Slightly.
Huron.....	" 28	114	42	Stiff.....	4	Bearded..	4,070	25 40	60	Badly.
Weldon.....	" 29	121	55	" ..	3½	Beardless.	5,940	25 ..	60	Slightly.
Preston.....	" 27	113	43	" ..	3½	Bearded..	4,510	25 ..	60	"
Byron.....	" 27	113	41	Fair.....	3	" ..	4,440	24 40	62	Badly.
Ebert.....	" 20	106	38	Weak.....	3	Beardless.	4,200	24 40	60	Slightly.
Australian No. 23.....	" 28	115	53	Stiff.....	4	" ..	6,120	24 30	58	"
Pringle's Champlain.....	" 27	113	39	Weak.....	2½	Bearded..	4,920	24 20	61	Badly.
Beauty.....	" 26	118	52	Stiff.....	4	Beardless.	5,735	24 20	59	"
Plumper.....	" 26	112	37	Weak.....	3	Bearded..	4,550	24 20	60	Slightly.
Australian No. 25.....	" 28	115	52	Stiff.....	4	Beardless.	5,320	24 ..	57	Badly.
Hungarian.....	" 28	115	52	Weak.....	4	Bearded..	4,620	23 50	63	Slightly.
Harold.....	" 20	106	37	" ..	2½	" ..	4,050	23 40	58	"
Fraser.....	" 25	111	41	Fair.....	4	" ..	4,255	23 20	60	Badly.
Japanese.....	" 20	106	49	Weak.....	2½	" ..	3,520	22 ..	58	"
Minnesota 181.....	" 31	117	48	Stiff.....	4	Beardless.	4,625	18 20	59	"
Vernon.....	" 27	113	41	" ..	3½	Bearded..	2,775	14 50	59	Slightly.

NOTE.—Vernon was injured by flood.

AVERAGE Results of a Test of Twelve Varieties of Wheat for the past Five Years.

Variety.	Years Included.	Yield per Acre.
		Bush. Lbs.
Goose.....	1898, 1899, 1900, 1901, 1902...	42 46
Monarch.....	1898, 1899, 1900, 1901, 1902...	35 24
Crown.....	1898, 1899, 1900, 1901, 1902...	34 30
White Fife.....	1898, 1899, 1900, 1901, 1902...	34 14
Wellman's Fife.....	1898, 1899, 1900, 1901, 1902...	33 14
White Connell.....	1898, 1899, 1900, 1901, 1902...	33 8
White Russian.....	1898, 1899, 1900, 1901, 1902...	33 7
Red Fife.....	1898, 1899, 1900, 1901, 1902...	32 46
Stanley.....	1898, 1899, 1900, 1901, 1902...	31 30
Dufferin.....	1898, 1899, 1900, 1901, 1902...	30 48
Percy.....	1898, 1899, 1900, 1901, 1902...	29 32
Hungarian.....	1898, 1899, 1900, 1901, 1902...	28 33

VARIETIES OF SPRING WHEAT GROWN FROM SELECTED AND UNSELECTED HEADS.

As in former years the largest heads were selected from the standing grain of last year, and the seed was sown this year for a comparison with unselected seed, from the same plots.

The plots were all one-twentieth acre, and each pair was sown in close proximity, the soil was a sandy loam. The accompanying table gives the result of each individual variety. A summary is also given which shows the average yield from the selected wheat fifteen pounds per acre greater than the unselected. Last year the unselected gave slightly the largest return.

WHEAT.

Variety.	Weight of Straw.		Yield per Acre.	Weight per Bushel.	Variety.	Weight of Straw.		Yield per Acre.	Weight per Bushel.
	Lbs.	Bush.				Lbs.	Bush.		
Goose—Selected.....	7,350	46	40	64	Progress--Selected.....	7,175	31	..	60
" Unselected.....	6,665	44	40	64	" Unselected.....	6,270	29	10	60
Rideau—Selected.....	7,020	36	..	60	Blenheim—Selected	6,240	30	50	59
" Unselected.....	6,460	31	10	60	" Unselected.....	5,775	30	20	58
Stanley—Selected	6,475	34	20	60	Alpha—Selected	6,475	30	40	59
" Unselected.....	6,355	31	20	60	" Unselected.....	5,330	29	40	60
Monarch—Selected	7,200	33	40	60	Crown—Selected	5,760	30	20	60
" Unselected	7,200	33	40	60	" Unselected.....	5,920	33	40	60
Campbell's White Chaff—Selct'd	5,760	33	40	61	Dawn—Selected.....	6,120	30	10	59
" Unselected	5,760	33	40	61	" Unselected.....	7,310	34	20	60
White Russian—Selected.....	7,995	32	50	59	Beaudry—Selected.....	6,105	30	..	62
" Unselected...	7,000	33	20	59	" Unselected.....	6,045	27	20	62
Blue Stem—Selected	7,020	32	40	60	White Connell—Selected.....	7,020	29	50	60
" Unselected.....	6,600	27	40	58	" Unselected....	5,950	32	..	60
Captor—Selected	7,020	32	30	60	Admiral—Selected.....	6,840	29	50	59
" Unselected.....	7,900	32	30	60	" Unselected.....	6,660	33	50	60
Colorado—Selected	6,150	32	20	60	Ladoga—Selected	4,715	28	20	60
" Unselected.....	5,700	30	20	60	" Unselected....	4,945	26	40	60
Red Fife—Selected.....	4,680	32	10	61	Beauty—Selected.....	5,655	27	50	59
" Unselected.....	6,300	31	..	60	" Unselected	5,735	24	20	59
Mason—Selected.....	5,950	32	..	61	Early Riga—Selected.....	5,440	26	40	59
" Unselected.....	5,600	32	30	61	" Unselected	5,120	28	20	59
Clyde—Selected	6,090	32	..	60	Dufferin—Selected.....	6,125	26	10	60
" Unselected.....	6,660	35	10	60	" Unselected.....	6,400	31	..	60
Dion's—Selected	6,630	31	40	61	Advance—Selected.....	3,840	26	..	60
" Unselected	4,840	31	..	62	" Unselected.....	4,440	28	20	61
Red Swedish—Selected.....	7,200	31	20	60	Hungarian--Selected	4,945	24	40	61
" Unselected	5,850	28	40	60	" Unselected.....	4,620	23	50	63

SUMMARY.

	Bush.	Lbs.
Average yield of 28 varieties, selected.....	31	18
" 28 unselected	31	3

A TEST OF FERTILIZERS ON A CROP OF SPRING WHEAT.

With one exception the fertilized plots have this year given the largest returns.

The size of the plots was one-fortieth acre. The soil was a sandy loam, summer-fallowed. All were sown on May 6, and all harvested on Aug. 30. There was no smut and very little rust. The straw on all the plots was quite stiff.

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The variety of wheat sown on all the plots was Red Fife. One and one-half bushels of seed per acre.

Red Fife Wheat, Fertilizers Applied.	Length of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.	Weight. per Bushel.
	in.	in.	Lbs.	Bush. Lbs	Lbs.
100 lbs. per acre of nitrate of soda, $\frac{1}{2}$ sprinkled when the grain was 2 in. high, balance when 6 in. high.....	45	3	3,150	33 20	60
200 lbs per acre of nitrate of soda, $\frac{1}{2}$ sprinkled when the grain was 2 in. high, balance when 6 in. high	45	3	3,780	28 ..	60
No fertilizer used.....	45	3	3,360	28 ..	60
Superphosphate, 400 lbs. per acre, spread just before sowing	45	3	3,780	35 20	60
Muriate of potash, 200 lbs per acre, spread just before sowing.....	45	3	3,600	37 20	60
A mixture, 200 lbs. superphosphate, 100 lbs. nitrate of soda, 100 lbs. muriate potash per acre, $\frac{1}{2}$ spread before sowing, $\frac{1}{2}$ when grain was 2 or 3 in. high .	45	3	3,840	38 ..	60

FALL WHEAT.

One of the 1-10th acre plots, surrounded by maple hedges, was sown on August 24, 1901, with fall wheat. The variety was New Ontario, grown in the East. The plants grew rapidly and were quite large by winter, but the plot was badly flooded in the spring, and nearly all the wheat killed. Four sheaves only were saved. The seed from these will be sown and tested again.

FALL RYE.

Two of the hedge plots were also sown on August 24, 1901, with fall rye. In one the seed sown was procured from Ontario, and the other was sown with Manitoba grown seed. Both lots wintered successfully. The plot sown with Manitoba seed yielded 62 bushels and 18 pounds per acre, weighing 56 pounds per bushel, and the plot sown with Ontario seed yielded 48 bushels and 16 pounds per acre, weighing 58 pounds per bushel. This last plot was somewhat injured by spring freshets, which, no doubt, largely accounts for the difference in yield.

FIELD PLOTS OF SPRING WHEAT.

Variety.	Character of Soil.	How Land was Prepared.	Size of Plots.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Yield per Acre.
			Acres.				Bush. Lbs.
Preston	Light sandy loam	Spring ploughed.	5	April 16..	Aug. 19..	125	10 24
Stanley	" "	" ..	3	" 19..	" 20..	123	11 43
White Fife.....	" "	" ..	5	" 23..	" 26..	125	10 24
Red Fife.....	" "	" ..	3	" 18..	" 26..	130	10 50
White Connell.....	" "	" ..	2	" 17..	" 25	130	14 55
Wellman's Fife.	" "	Corn land.....	3	" 29..	" 29..	122	22 20
Dawn.....	Clay loam.	Summer fallow..	2	May 1..	" 25..	116	27 10
Crown..	"	" ..	2	" 6..	" 30..	116	18 20
Monarch	"	" ..	1	" 7..	" 30..	115	26 15
Huron..	"	" ..	2	" 7..	" 26..	111	30 20
Laurel	"	" ..	1	" 7..	Sept. 3..	119	36 5
White Russian	"	" ..	1	" 13..	Aug. 29..	108	38 30
Speltz.	"	" ..	2	" 13..	" 29..	108	39 6

These results show the great advantage of summer fallow over spring ploughing.

EXPERIMENTS WITH SPELTZ.

THICK AND THIN SOWING.

In last year's test the amount of seed was regulated by the drill. This year the seed was weighed, but the result is the same. One and three-quarter bushels giving the largest yield.

SPELTZ WHEAT—THICK AND THIN SOWING.

Name of Variety.	Amount of Seed Sown Per Acre.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.
							Bush.	Lbs.	
Speltz.....	50 pounds. . . .	116	32	Stiff.....	2	Bearded. . . .	42	20	44
"	62½ "	116	32	"	2	"	46	40	45
"	75 "	116	32	"	2	"	52	20	45
"	87½ "	116	32	"	2	"	54	40	45
"	100 "	116	32	"	2	"	50	20	44

SPELTZ, EARLY AND LATE SOWING.

These experiments were undertaken with the object of gaining some information as to the best time for sowing this grain. This will probably need repeating for several years before any satisfactory conclusion can be reached.

SPELTZ WHEAT—EARLY AND LATE SOWING.

Name of Variety.	Character of Soil.	Size of Plot.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
											Lbs.	Bush. Lbs.	
Speltz.....	Sand loam	1/30 acre	May 6	Aug. 27	113	47	Stiff	2½	Bearded..	4,275	59	..	46
"	"	1/20 "	" 13	" 30	109	42	"	2½	" ..	3,630	52	..	45
"	"	1/20 "	" 20	Sept. 3	106	39	"	2	" ..	5,060	56	20	44
"	"	1/20 "	" 27	" 6	102	41	"	2	" ..	3,400	61	..	43

EXPERIMENTS WITH OATS.

The yield of oats throughout the province has been much above the average. On the Experimental Farm, a few of the varieties were sown at the usual date early in May but owing to the excessive rainfall they were destroyed. A fresh location was selected and the second lot was sown on May 28, much later than is desirable. This late sowing no doubt lessened the yield and reduced the weight per bushel.

The tests were made with sixty-four varieties, on plots of one-twentieth acre each. The soil was a clay loam, summer fallowed, and two bushels of seed were used per acre sown with a drill. All were sown on May 27 and 28.

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OATS—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.	Rusted.
			In.		In.		Lbs.	Bush.	lbs.	Lbs.	
Early Golden Prolific ..	Sept. 6	101	40	Stiff.....	10	Branching	3,562	88	28	34	Slightly.
Buckbee's Illinois.....	" 8	103	49	"	8	" ..	7,200	82	12	36	"
Siberian	" 8	103	53	"	11	" ..	6,475	82	2	35	Badly.
Holstein Prolific.....	" 6	102	41	"	8 ¹ / ₂	Sided.....	5,700	81	6	35	"
Mennonite.....	" 4	100	41	"	9 ¹ / ₂	"	4,980	77	2	36	"
Joanette.....	" 10	105	48	Weak	6	Branching	7,200	74	24	34	"
Wallis	" 6	101	42	Stiff.....	9	" ..	6,337	74	24	35	"
Early Maine.....	" 6	101	51	"	9	" ..	7,036	74	24	35	Slightly.
Hazlett's Seizure.....	" 4	99	47	Fair.....	10	" ..	5,610	73	28	36	Badly.
Abundance	" 5	101	45	Stiff.....	7	" ..	5,329	72	2	37	"
American Triumph.....	" 7	103	38	"	7	" ..	4,937	70	30	37	"
Banner.....	" 6	102	42	"	10	" ..	5,395	70	20	35	"
Sensation	" 4	99	49	Fair.....	11	" ..	5,692	70	..	36	"
Golden Giant.....	" 11	106	54	"	12	Sided.....	3,560	70	..	32	"
Danish Island.....	" 7	103	39	Stiff..	9	Branching	5,250	67	2	36	"
Bonanza	" 1	97	44	"	9	" ..	5,655	67	32	39	"
Columbus.....	" 7	103	44	"	8	" ..	4,437	66	6	36	"
Lincoln.....	" 6	102	43	Stiff.....	10	" ..	4,255	65	10	38	"
Wide Awake	" 6	102	49	"	9	" ..	6,300	64	24	37	"
Early Gothland..	" 7	102	55	Fair.....	11 ¹ / ₂	Sided.....	6,600	64	24	35	"
Improved American....	" 5	100	53	Stiff.....	12	Branching	4,927	64	4	36	"
Tartar King.....	" 7	102	50	Fair.....	11	Sided.....	6,045	63	8	33	"
Thousand Dollar.....	" 7	103	49	Stiff..	8	Branching	4,680	63	8	36	"
Early Archangel.....	" 6	102	47	"	7	" ..	5,735	62	32	37	"
New Zealand	" 8	103	55	Fair.....	11	Sided.....	6,570	62	2	35	Slightly.
Cream Egyptian.....	" 4	99	47	"	10 ¹ / ₂	"	5,850	61	26	36	Badly.
Newmarket.....	" 4	99	47	Stiff.....	8	Branching	5,125	61	6	36	"
American Beauty.....	" 5	100	43	"	9	" ..	4,781	61	6	36	"
Bavarian	" 6	102	42	"	10	" ..	4,937	61	6	34	"
Scotch Potato.....	" 6	102	41	"	9	" ..	6,845	61	6	35	"
Irish Victor	" 7	103	42	"	8	" ..	4,937	60	30	36	"
Brandon.....	" 7	103	51	"	12	" ..	5,200	60	20	36	"
Waverley	" 6	101	40	"	12	" ..	3,690	60	13	35	"
Black Beauty.....	" 10	105	51	Weak	11	" ..	6,290	60	..	33	"
Golden Tartarian.....	" 14	110	51	Stiff..	10	Sided.....	6,600	59	24	32	"
Oxford	" 7	103	46	"	11 ¹ / ₂	" ..	5,040	59	14	35	"
Holland	" 12	108	35	"	9	" ..	4,305	57	32	32	"
Golden Beauty.....	" 6	101	45	"	7	Branching	4,440	56	16	35	"
California Prolific Black	" 10	105	58	Fair.....	11	Sided.....	6,600	56	16	32	"
Kendal.....	" 6	102	46	Stiff.....	7	" ..	5,610	56	6	36	"
Oderbruch.....	" 6	101	48	"	10 ¹ / ₂	" ..	4,025	55	23	35	"
Pense	" 11	106	58	Weak	10	" ..	7,095	55	10	34	"
Russell	" 8	104	41	Stiff.....	11	Branching	7,695	54	24	39	"
King.....	" 6	102	50	"	10	" ..	5,400	54	14	37	"
Goldfinder	" 7	102	47	"	10 ¹ / ₂	Sided.....	5,220	53	28	33	"
Early Blossom.....	" 8	103	47	"	10	" ..	6,300	53	18	32	"
Black Mesdag	" 6	101	40	Weak	13	Branching	3,720	53	18	35	"
Master.....	" 7	102	48	Stiff..	12	" ..	5,460	53	8	34	"
White Schonen.....	" 6	102	43	"	8	" ..	4,995	53	8	35	"
Prolific Black Tartarian	" 13	108	56	Fair.....	10	Sided.....	6,555	51	6	33	"
Improved Ligowo	" 6	101	41	Stiff.....	7	Branching	4,400	51	6	37	"
Milford.....	" 14	110	48	"	9	Sided.....	5,330	50	20	30	"
White Giant.....	" 6	101	43	"	9	Branching	3,832	50	..	34	"
Miller.....	" 5	100	44	Fair.....	9	" ..	5,510	47	32	33	"
Abyssinia.....	" 5	100	42	"	9	" ..	6,360	47	22	33	"
Salines	" 7	103	47	Stiff.....	10	" ..	5,100	47	12	34	"
Flying Scotchman	" 4	100	47	"	11	" ..	4,387	47	2	38	"
Olive.....	" 12	107	57	"	10	Sided.....	6,300	45	20	34	"
White Russian.....	" 5	100	43	"	10 ¹ / ₂	" ..	6,935	45	..	34	"
Salzer's Big 4.....	" 6	102	41	"	10	Branching	2,635	43	28	36	"
Pioneer	" 10	105	48	"	8	" ..	4,785	43	8	32	"
Rosedale	" 7	102	31	Fair.....	8	Sided.....	4,230	42	22	30	"
Longhoughton.....	" 7	102	52	Stiff.....	9	Branching	6,000	36	16	30	"
Cromwell	" 6	102	43	"	11	" ..	1,360	18	28	34	"

NOTE.—Cromwell was injured by the flood.

AVERAGE results of a test of Twelve Varieties of Oats for the past five years.

Variety.	Years included.	Average yield per Acre.	
		Bush.	Lbs.
Banner.....	1898-99, 1900-01-02	80	2
American Triumph.....	1898-99, 1900-01-02	76	16
Bavarian.....	1898-99, 1900-01-02	75	32
American Beauty.....	1898-99, 1900-01-02	75	27
Mennonite.....	1898-99, 1900-01-02	74	12
Danish Island.....	1898-99, 1900-01-02	73	38
Oxford.....	1898-99, 1900-01-02	73	12
White Giant.....	1898-99, 1900-01-02	72	21
White Schonen.....	1898-99, 1900-01-02	70	41
Thousand Dollar.....	1898-99, 1900-01-02	67	45
California Prolific Black.....	1898-99, 1900-01-02	67	23
Newmarket.....	1898-99, 1900-01-02	66	36

EXPERIMENTS WITH BARLEY.

The selection of the field for this year's uniform test plots of barley was an unfortunate one. A municipal ditch running near the field overflowed its banks during the cloud-burst on June 1, and the flood of water swept the field from end to end, removing the soil in some places down to the roots of the plant. The grain never fully recovered, the yield from most of the plots is unusually small, and so uneven that the returns are not given as a correct comparison of varieties, but simply as a matter of information.

Fifty-one varieties of barley were tested. Thirty of the six-rowed sorts and twenty-one of the two-rowed. The size of the plots used for this test was one-twentieth acre. The soil was a light sandy loam which had been summer fallowed. All were sown on May 26 and 27 in the proportion of two bushels of seed per acre.

BARLEY—SIX-ROWED—TEST OF VARIETIES.

Name o. Variety.	Date of Ripen-ing.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.	Rusted.
			In.		In.	Lbs.	Bush. Lbs.	Lbs.	
Petschora.....	Sept. 1	98	42	Stiff.....	4	4,185	43 36	46	Slightly.
Mensury.....	Aug. 22	88	40	".....	4	5,915	42 4	47	"
Rennie's Imp'vd.....	" 22	87	40	".....	4	3,250	36 12	48	"
White Hulless.....	Sept. 3	99	35	Weak.....	2½	4,200	35 30	55	"
Black Hulless.....	Aug. 27	92	30	Fair.....	3	3,770	32 34	58	"
Common.....	" 25	90	31	Stiff.....	3	1,360	31 2	49	"
Garfield.....	" 26	91				1,350	30 20	48	"
Odessa.....	Sept. 2	98	33	Fair.....	3½	2,422	29 8	45	Badly.
Stella.....	Aug. 26	91				1,275	26 12	48	Slightly.
Empire.....	Sept. 4	101	33	Stiff.....	3½	2,295	25 40	45	Badly.
Phoenix.....	Aug. 20	86	23	".....	2½	1,125	24 28	49	None.
Argyle.....	" 22	87	36	".....	2	1,275	24 8	48	Slightly.
Pioneer.....	" 20	85	29	Fair.....	3	840	23 6	50	"
Summit.....	Sept. 4	101	29	Stiff.....	3	2,422	22 4	44	Badly.
Nugent.....	Aug. 24	90	22	".....	2	780	20 40	48	None.
Albert.....	" 19	84	22	".....	2½	750	20 20	51	"
Brome.....	" 20	85	27	".....	2½	825	20 20	49	"
Claude.....	" 25	90	24	".....	2½	845	19 18	45	Slightly.
Success.....	" 20	85	31	".....	2	1,050	18 16	47	Badly.
Oderbruch.....	" 20	85	29	".....	2½	600	17 44	49	None.
Mansfield.....	" 20	85	22	".....	3	585	17 4	48	Slightly.
Trooper.....	" 25	90	24	".....	3	700	17 4	48	None.
Excelsior.....	" 20	85	28	".....	3	700	15 40	44	Slightly.
Vanguard.....	" 20	85	30	Fair.....	4	630	15 30	47	"
Surprise.....	Sept. 4	100	32	Stiff.....	3	1,620	15	43	Badly.
Baxter.....	Aug. 20	85	23	Fair.....	2½	525	14 28	49	Slightly.
Yale.....	" 20	85	27	".....	3	420	13 16	49	"
Blue Long Head.....	" 20	85	25	".....	3½	560	13 6	43	"
Champion.....	Sept. 4	100	32	Stiff.....	3	1,200	12 24	42	Badly.
Royal.....	Aug. 20	85	22	Fair.....	3	325	9 28	49	Slightly.

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BARLEY—TWO-ROWED—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.	Rusted.
			In.		In.	Lbs.	Bush. Lbs.	Lbs.	
Danish Chevalier	Sept. 7	103	23	Fair.....	4	3,500	43 46	47	Slightly.
Harvey.....	" 3	99	30	Stiff.....	3	5,265	37 44	50	"
Standwell	Aug. 31	97	32	"	3½	1,920	36 22	49	None.
Nepean.....	Sept. 3	99	28	"	3½	2,160	34 28	48	Slightly.
Victor.....	" 2	99	24	"	3	1,875	32 4	50	"
Kinver Chevalier	" 7	103	28	Fair.. ..	4	3,240	29 28	45	"
Bolton	" 2	99	26	Stiff.....	2½	1,725	29 8	50	None.
Leslie	Aug. 26	92	27	"	3	2,090	28 36	49	Slightly.
Dunham.....	" 30	96	28	"	4	1,350	27 44	48	None.
Gordon... ..	" 30	95	25	"	3	1,800	27 24	48	"
Invincible	Sept. 3	99	20	"	3½	1,875	27 14	49	"
Logan	Aug. 26	92	29	"	4	1,500	26 12	49	Slightly.
French Chevalier	" 31	97	30	"	4	1,040	26 12	48	None.
Clifford.....	" 26	91	33	"	4	1,920	23 33	49	Slightly.
Fulton	" 30	96	23	"	3	1,680	21 12	48	None.
Beaver.....	Sept. 3	99	29	"	3½	1,300	21 12	50	Slightly.
Prize Prolific....	" 2	98	28	"	4	1,200	20 20	46	None.
Jarvis.....	Aug. 23	89	34	"	4	1,120	19 8	48	"
Newton	Sept. 2	98	23	"	3	975	14 8	47	"
Sidney	Aug. 21	87	21	"	2½	640	14 8	51	Slightly.
Canadian Thorpe	Sept. 1	98	20	"	3	680	7 24	48	None.

EXPERIMENTS WITH PEASE.

The field used for the test of varieties of pease suffered severely from the flooding of the Assiniboine River, and only ten varieties out of the fifty-seven were harvested.

The size of the plots for this test was one-twentieth acre and the soil a rich clay loam, summer-fallowed.

All were sown on May 13 and 14.

PEASE—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of days maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.	Weight per Bushel.
				Inches.	Inches.		Bush. Lbs.	Lbs.
Crown.....	Sept. 14..	124	Weak	50	2	Small	61 ..	65½
French Canner.....	Aug. 25..	104	Fair.	60	2½	"	56 ..	65
Golden Vine.....	Sept. 7..	117	Weak	66	2	"	54 40	64½
Mummy.....	" 10..	120	Fair.	48	2	"	52 20	62½
Canadian Beauty.	" 13..	123	Rank.	48	2½	Large	44 ..	64
Daniel O'Rourke	" 7..	116	Fair.	58	1¾	Small	42 40	65
Creeper.....	Aug. 25..	104	"	69	2¼	"	41 40	65
Carleton.....	Sept. 15..	124	"	52	2¼	"	41 20	64
Archer	" 12..	121	"	66	2½	"	40 20	65
Pearl.	" 14..	124	Rank.	64	2¼	"	40 20	64
Prince Albert.....	" 16..	126	"	64	2½	"	38 20	63
Herald	" 13..	122	Fair.	56	2¼	"	37 40	64
Bedford	" 7..	117	Rank.	68	2¼	"	36 20	65
Elder	" 16..	125	"	54	2¼	"	33 40	64½
King.....	" 5..	114	"	54	2½	Medium..	31 20	65
Multiplier.....	" 16..	125	Fair.	62	2	Small	30 40	62½
Fergus.....	" 27..	137	Rank.	61	2¼	"	26 40	65

NOTE.—Grass Pea did not mature.

EXPERIMENTS WITH FLAX.

Since the increased immigration from the United States more attention has been given to the cultivation of flax, and this year a considerable area of new breaking was sown with this crop.

One of the objections to the sowing of flax is the great difficulty of procuring pure seed. This year several new varieties were tested on the Experimental Farm and in nearly every instance the sample was badly infested with noxious weed seeds. One sample contained no less than six different varieties of mustard, all of which were pulled by hand as they blossomed.

Appended will be found tables giving the result of experiments with flax.

FLAX—THICK AND THIN SOWING.

The size of plots for this test was one-twentieth acre, and the soil was a clay loam which had been summer-fallowed. The sowing was done with a Massey Harris grain drill. It is, however, difficult to sow evenly with this machine if less than twenty pounds of seed per acre are used.

The result of this year's test would indicate that a liberal amount of seed gives the best results. This agrees with the results obtained last year.

Variety.	Amount of Seed sown per Acre.	Date of Sowing.	Length of Straw.	Yield per Acre.		Weight per Bushel.
	Lbs.		In.	Bush.	Lbs.	Lbs.
Flax.....	15	June 5....	32	12	8	56
".....	20	" 5....	32	16	44	56
".....	30	" 5....	32	18	32	56
".....	40	" 5....	32	19	16	56
".....	50	" 5....	32	21	4	56

FLAX—TEST OF VARIETIES.

Several varieties of flax have been tested during the year. The amount of seed available of each kind was small, and the sowing was too thin for the best results, but the product of this year's crop has been saved and larger plots can be sown next year.

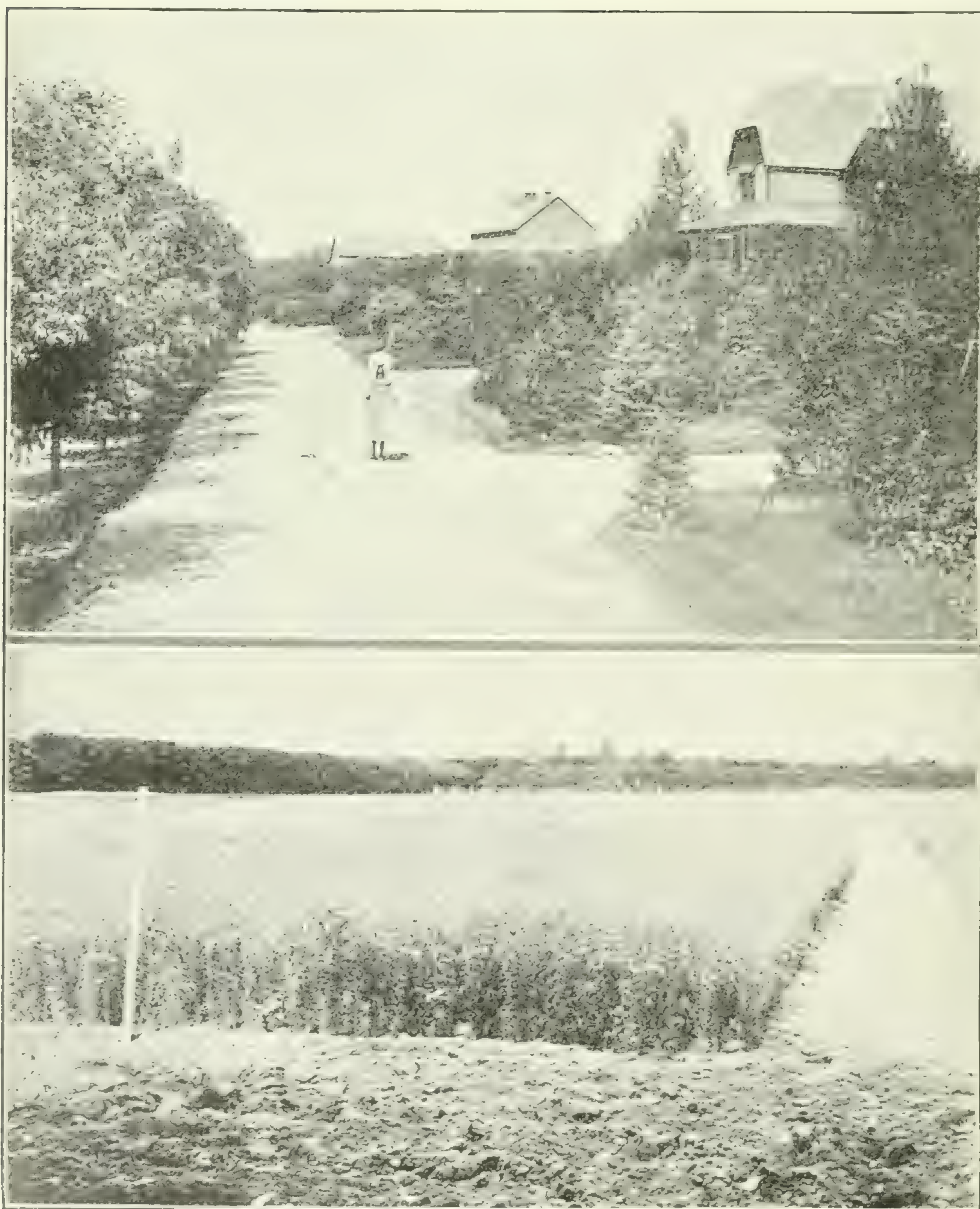
In addition to the seven varieties given in the following table one was obtained from Calcutta. This proved so short that it was impossible to cut it with a binder. The size of the plots was $\frac{1}{60}$ acre. The soil was a rich clay loam and the previous crop fodder corn.

Variety.	Date Sown.	Date Ripe.	Length of Straw.	Length of Head.	Yield per Acre.	
			In.	In.	Bush.	Lbs.
Novarossick.....	June 5....	Sept. 10..	29	8	22	28
Russian.....	" 5....	" 6 ..	27	7	11	44
Riga.....	" 5....	" 5..	31	13	9	36
Common.....	" 5....	" 5..	32	6	9	36
La Plata	" 5....	" 10..	26	10	9	36
St. Petersburg.....	" 5....	" 4..	37	8	6	24
Bombay.....	" 5....	" 5..	19	10	5	20





FODDER CORN.



[Photos. by C. E. Saunders.]
ROAD PLANTING NEAR RESIDENCE OF SUPERINTENDENT.
EXPERIMENTAL PLOTS OF FLAX, BRANDON, MAN.

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FLAX ON NEW BREAKING.

As much the largest proportion of flax produced in this country is grown on new breaking, it was thought advisable to give this plan a trial on the Experimental Farm. Owing to the field being flooded for some days the yield is small, but the result agrees with a similar test on cultivated land, viz., that a liberal amount of seed gives the best crop.

The land was broken on May 17 but was not dry enough to sow until June 11. The size of the plots was one-fortieth acre, and the soil was a stiff clay loam.

Variety.	Amount of Seed sown per Acre.	Date Sown.	Date Cut.	Length of Straw.	Yield per Acre.	
	Lbs.			In.	Bush.	Lbs.
Flax	15	June 11...	Sept. 16..	29	5	49
"	20	" 11...	" 16..	29	6	24
"	30	" 11...	" 16..	29	6	24
"	40	" 11...	" 16..	29	7	48
"	50	" 11...	" 16..	29	7	8

THE GERMINATING POWER OF GRAIN.

As usual samples of all the plots of grain on the farm were tested at the Central Experimental Farm, for germination, altogether 274 samples were tested with the following result:—

	No. of samples tested.	Average germinating power.
		Per cent.
Wheat.....	99	91
Oats.....	63	98
Barley.....	56	82
Pease.....	56	96

EXPERIMENTS WITH INDIAN CORN.

Owing to the almost continuous rain during the latter part of May, corn was not sown until May 31, about two weeks late. This late sowing followed by cool cloudy weather greatly retarded growth, lessened the yield, and prevented the plant reaching its usual stage of maturity.

The corn binder was again used with very satisfactory results.

Thirty-eight varieties were used in this test, and the seed was planted on May 31, in rows thirty inches apart, using about half a bushel of seed per acre. The crop was cut on Sept. 5. The soil was a sandy loam sloping to the south. The previous crop was wheat. The yield in each case was calculated from the weight of two rows each sixty-six feet long.

INDIAN CORN—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	Height.	When Tasselled.	In Silk.		Early Milk.	Con- dition when Cut.	Weight per		Weight per	
								acre grown		acre grown	
								in rows.		in hills.	
		In.						Tons.	Lbs.	Tons.	Lbs.
Salzer's All Gold.....	Fair....	87	Aug. 28	Sept. 4	.....	In silk....	16	1,000	19	16	
Champion White Pearl.....	"	86	" 28	" 4	.....	" .....	18	696	13	665	
Mammoth Eight-rowed Flint.....	Rank....	75	" 10	Aug. 30	Sept. 4	E. milk....	18	432	11	1,760	
North Dakota Yellow.	Fair....	65	" 25	Sept. 3	.....	In silk....	17	1,904	15	360	
Pearce's Prolific.....	Rank....	79	" 16	" 27	Sept. 3	E. milk....	16	1,528	12	816	
North Dakota White	Fair....	80	" 19	Aug. 28	Aug. 30	L. milk....	16	1,264	10	1,120	
King of the Earliest.....	"	84	" 18	" 27	Sept. 3	E. milk....	16	1,000	12	816	
Eureka.....	"	84	" 29	.....	.....	In tassel..	16	736	13	1,720	
Early Butler.....	"	74	" 23	Aug. 30	Sept. 3	E. milk....	16	472	12	816	
King Philip.....	"	84	" 22	" 30	" 4	"	15	1,680	11	704	
Superior Fodder	"	79	" 30	Sept. 4	.....	In silk....	15	888	8	1,160	
Compton's Early.....	Rank....	94	" 20	Aug. 31	Sept. 4	E. milk....	15	624	15	1,680	
Angel of Midnight.....	Fair....	81	" 20	" 29	" 4	"	15	624	11	440	
Mammoth Cuban	Rank....	75	" 25	" 28	.....	In silk....	14	1,832	7	1,840	
Early Mastodon	Fair....	84	" 29	Sept. 4	.....	" .....	14	1,568	11	1,760	
Longfellow	Rank....	84	" 20	Aug. 29	Sept. 4	E. milk....	14	1,040	9	1,800	
Pride of the North.....	Fair....	93	" 28	Sept. 3	.....	In silk....	14	1,040	13	460	
Evergreen Sugar.....	Rank....	69	" 27	" 4	.....	" .....	13	1,720	10	1,120	
Early Golden Surprise	Fair....	83	" 26	" 4	.....	" .....	13	1,192	8	1,424	
Rural Thorobred White Flint.....	Rank....	77	" 28	" 5	.....	" .....	13	928	11	1,232	
Kendal's Early Giant.....	Fair....	65	" 14	Aug. 20	Aug. 30	L. milk....	13	400	7	520	
Country Gentleman.....	"	61	" 26	Sept. 4	.....	In silk....	13	400	6	1,200	
Mitchell's Extra Early	Weak ..	65	" 12	Aug. 20	Aug. 27	L. milk....	12	1,080	8	1,160	
Salzer's Earliest Ripe	"	70	" 14	" 20	" 29	"	11	1,760	8	896	
Canada White Flint.....	Fair....	80	" 20	" 29	Sept. 3	E. milk....	11	1,760	9	480	
Early Yellow Long-eared.....	"	76	" 25	Sept. 3	.....	In silk....	11	1,760	13	400	
Selected Leaming.....	"	78	Sept. 3	.....	.....	In tassel..	11	1,760	11	1,496	
Giant Prolific Ensilage	Rank....	70	" 4	.....	.....	" .....	11	1,760	13	400	
Yellow Six Weeks.....	Fair....	65	Aug. 20	Aug. 27	Sept. 5	E. milk....	11	968	10	328	
Extra Early Huron.....	"	81	" 14	" 20	Aug. 30	L. milk....	11	704	5	1,088	
Red Cob Ensilage.....	Rank....	86	" 3	Sept. 5	.....	In silk....	11	440	11	1,760	
Cloud's Early Yellow.....	Fair....	86	Sept. 1	.....	.....	In tassel..	11	1,760	13	400	
Black Mexican.....	Weak....	68	Aug. 10	Aug. 26	Sept. 4	E. milk....	10	1,648	10	1,120	
Wisconsin Earliest White Dent..	"	80	" 28	Sept. 3	.....	In silk....	10	1,384	10	328	
Early August.....	"	45	" 12	Aug. 21	Aug. 27	L. milk....	8	1,120	9	160	
White Cap Yellow Dent.....	Fair....	83	Sept. 1	.....	.....	In tassel..	8	896	8	1,424	
Sanford .....	.....	76	Aug. 26	Sept. 1	.....	In silk....	8	104	8	368	

INDIAN Corn at Different Distances Apart.

Name of Variety.	Distance between rows.	Height.	Condition when cut.	Weight per	
				acre, green, in rows.	
				Tons.	Lbs.
Longfellow.....	24	76	In silk.....	8	1,820
"	30	76	"	8	1,160
"	36	76	"	14	1,456
"	42	76	"	17	584
Selected Leaming	24	83	In tassel.....	11	1,760
"	30	83	"	13	400
"	36	83	"	17	320
"	42	83	"	16	1,000
Champion White Pearl.....	24	84	In silk.....	13	796
"	30	84	"	15	1,020
"	36	84	"	13	1,852
"	42	84	"	13	400

Average Yield at Different Distances Apart.				In Rows.	
				Tons.	Lbs.
Average yield of green corn, 24 inches apart.....				11	792
" " 30 "				12	860
" " 36 "				15	536
" " 42 "				15	1,328

EXPERIMENTS WITH TURNIPS.

Thirty varieties of turnips were tested this year. As usual two sowings were made of each variety. The first on May 25 and the second on June 9. The first sowing was covered by water for some days, which so packed the soil that the yield was materially lessened. The second sowing escaped the flood, and for the first time in the history of the farm nearly all varieties gave a larger yield than those of the early sowing. The roots from both sowings were pulled October 2.

The soil on which the turnips were sown was a clay loam. The previous crop was potatoes. The seed was sown in drills thirty inches apart, and the yield has been calculated from the weight of roots gathered from two rows each sixty-six feet long. All were pulled on October 2.

TURNIPS—TEST OF VARIETIES.

Name of Varieties.	Character of Growth.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
		Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Skirving's	Strong.....	25	424	840	24	18	696	611	36
Champion Purple Top	"	21	1,824	730	24	26	536	875	36
Webb's New Renown.....	"	21	504	708	24	23	464	774	24
New Arctic.....	Fair.....	20	1,976	699	36	21	768	712	48
Bangholm Selected	"	19	1,600	660	..	20	1,184	686	24
Magnum Bonum.	Strong.....	19	544	642	24	20	392	673	12
Good Luck.....	Fair.....	19	16	633	36	22	616	743	36
Shamrock Purple Top.....	"	18	168	602	48	20	920	682	..
Kangaroo	Strong.....	18	1,224	620	24	21	504	708	24
Perfection Swede.....	Weak	18	432	607	12	23	1,784	796	24
Sutton's Champion	Fair.....	17	1,112	585	12	19	280	638	..
Jumbo	Strong.....	17	56	567	36	15	1,680	528	..
Selected Champion	Fair.....	16	472	541	12	13	400	440	..
Halewood's Bronze Top.....	"	15	1,152	519	12	18	1,488	624	48
Marquis of Lorne	"	15	888	514	48	17	1,904	598	24
Prize Purple Top.....	"	15	888	514	48	20	920	682	..
West Norfolk Red Top	"	15	888	514	48	16	208	536	48
Hall's Westbury.....	Strong.....	15	624	510	24	15	1,416	523	36
Giant King.....	"	15	360	506	..	16	1,264	554	24
Prize Winner.....	"	15	96	501	36	21	768	712	48
East Lothian	"	14	1,568	492	48	16	1,264	554	24
New Century.....	"	13	1,984	466	24	17	1,640	594	..
Elephant's Master	Fair.....	13	1,984	466	24	16	208	536	48
Drummond Purple Top.....	Strong... ..	13	1,720	462	..	21	504	708	24
Carter's Elephant.....	"	13	1,456	457	36	15	360	506	..
Selected Purple Top.....	"	13	400	440	..	19	544	642	24
Monarch	Fair.....	12	1,344	422	24	16	1,000	550	..
Emperor	"	11	1,760	396	..	17	56	567	36
Mammoth Clyde.....	Weak	10	1,384	356	24	21	1,560	726	..
Imperial Swede.....	Fair.....	9	1,272	321	12	20	1,976	699	36

EXPERIMENTS WITH MANGELS.

Twenty-seven varieties of mangels were tested during the year. Two sowings were made of each variety. The first on May 27 and the second on June 10, and both lots were pulled September 20. The first sown plots of mangels were also injured by water, resulting in a small yield.

The seed was sown in drills 30 inches apart on sandy loam, and the yield has been calculated from the weight of roots gathered from two rows each 66 feet long. All were pulled on Sept. 20.

MANGELS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre.		Yield per Acre.		Yield per Acre.		Yield per Acre.	
	1st Plot.		1st Plot.		2nd Plot.		2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Half Long Sugar Rosy.....	16	1,132	552	12	11	704	378	24
Selected Yellow Globe.....	15	1,944	532	24	17	1,376	589	36
Yellow Intermediate.....	14	248	470	48	15	96	501	36
Lion Yellow Intermediate.....	13	1,984	466	24	16	1,792	563	12
Champion Yellow Globe.....	13	1,456	457	36	14	1,304	488	24
Selected Mammoth Long Red.....	13	669	444	29	14	1,848	497	29
Sutton's Prize Winner Yellow Globe.....	13	664	444	24	15	1,152	519	12
Mammoth Long Red.....	12	1,344	422	24	17	584	576	24
Half Long Sugar White.....	12	552	409	12	15	96	501	36
Norbiton Giant.....	12	288	404	48	17	320	572	..
Giant Yellow Intermediate.....	11	1,892	398	12	15	1,152	519	12
Canadian Giant.....	11	1,496	391	36	15	360	506	..
Triumph Yellow Globe.....	11	1,232	387	12	14	1,304	488	24
Gate Post.....	11	440	374	..	15	888	514	48
Yellow Fleshed Tankard.....	11	176	369	36	10	1,912	365	12
Prize Mammoth Long Red.....	11	176	369	36	15	1,152	519	12
Red Fleshed Tankard.....	11	176	369	36	15	1,152	519	12
Mammoth Oval Shaped.....	10	1,912	365	12	14	1,832	497	42
Mammoth Yellow Intermediate.....	10	1,912	365	12	13	1,192	453	12
Leviathan Long Red.....	10	1,232	354	12	15	96	501	36
Gate Post Yellow.....	10	1,120	352	..	14	1,040	484	..
Ward's Large Oval Shaped.....	10	988	349	48	15	1,152	519	12
Giant Sugar.....	9	1,800	330	..	14	776	479	36
Golden Fleshed Tankard.....	8	1,952	299	12	13	1,720	462	..
Giant Yellow Globe.....	7	1,576	259	36	14	1,040	484	..
Giant Yellow Half Long.....	7	1,048	250	48	17	584	576	24
Warden Orange Globe.....	5	32	167	12	14	1,304	488	24

EXPERIMENTS WITH CARROTS.

The yield of carrots was again a very irregular one. A few varieties gave good returns while others gave a very small yield.

The soil was a clay loam, in potatoes the previous year. The estimate of yield has been made from the roots produced on two rows each 66 feet long.

Twenty-one varieties were tested. The first sowing was made on May 27. and the second on June 10. The seed was sown in drills 16 inches apart, and the roots were pulled on October 2.

CARROTS—TEST OF VARIETIES.

Name of variety.	Charac- ter of growth.	Yield per acre. 1st plot.		Yield per acre. 1st plot.		Yield per acre. 2nd plot.		Yield per acre. 2nd plot.	
		Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
New White Intermediate.....	Strong.....	16	120	535	20	9	1,800	330	..
Ontario Champion	"	14	160	469	20	11	....	366	40
Carter's Orange Giant... ..	Fair.....	12	200	403	20	9	1,800	330	..
Green Top White Orthe.....	Strong.....	11	1,320	388	40	13	1,280	454	40
White Vosges Large Short.....	"	11	1,320	388	40	10	680	344	40
Yellow Intermediate.....	"	11	....	366	40	11	1,320	388	40
White Belgian.....	"	9	1,800	330	..	9	40	300	40
Half Long Chantenay.	Fair.. ...	9	1,360	322	40	12	640	410	40
Long Yellow Stump Rooted... ..	"	9	480	308	..	12	640	410	40
Guerande or Ox-heart.....	"	9	40	300	40	13	840	414	..
Giant White Vosges.....	"	9	40	300	40	9	1,800	330	..
Iverson's Champion.....	Strong.....	8	720	278	40	11	880	381	20
Early Gem	Weak.....	7	1,840	264	..	9	480	308	..
Half Long White.....	Strong.....	7	960	249	20	9	1,800	330	..
Improved Short White.....	Weak.....	7	80	234	40	5	1,880	198	..
Scarlet Intermediate.....	"	6	1,640	227	20	10	240	337	20
Yellow Intermediate	"	6	760	212	40	8	280	271	20
Long Orange or Surrey.....	"	6	320	205	20	5	1,880	198	..
Mammoth White Intermediate....	"	5	120	168	40	14	1,480	491	20
Long Scarlet Altringham.....	"	3	1,480	124	40	4	800	146	40
Scarlet Nantes	"	3	160	102	40	4	360	139	20

EXPERIMENTS WITH SUGAR BEETS.

Eight varieties of sugar beets were sown. The yield was below the average from the same cause that injured the other field roots. The quality of the roots was excellent.

The soil was a clay loam, and the previous crop was potatoes. The seed was sown on the flat, in drills two feet apart.

The first plots were sown on May 27, and the second on June 10. All were pulled on September 20. The yield has been calculated from the weight obtained from two rows each 66 feet long.

SUGAR BEETS—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	Yield per acre. 1st plot.		Yield per acre. 1st plot.		Yield per acre. 2nd plot		Yield per acre. 2nd plot	
		Tons.	lbs.	Bush.	lbs.	Tons.	lbs.	Bush.	lbs.
Red Top Sugar.....	fair.	13	928	448	48	12	24	400	24
Danish Improved.....	"	12	24	400	24	14	512	475	12
Royal Giant.....	"	8	1,424	290	24	14	1,040	484	..
French 'Very Rich.' ..	"	8	1,160	286	..	9	1,800	330	..
Danish Red Top.....	"	8	500	275	..	13	1,192	453	12
Wanzleben.. ..	"	7	1,048	250	48	12	552	409	12
Improved Imperial.....	"	6	672	211	12	12	1,344	422	24
Vilmorin's Improved ..	"	5	296	171	36	12	288	404	48

EXPERIMENTS WITH POTATOES.

The very heavy rain of June 1 cut deep gulleys through the potato field and in other parts the soil was packed so hard that it appeared impossible for the potatoes to grow, but the soil was deeply stirred as soon as dry with a horse cultivator. The growth was then rapid and much to our surprise the yield of most of the varieties was above the average.

The average yield of twelve of the most productive varieties covering a period of five years also is given. Of these we would recommend the following as being both prolific and of good quality : I X L, Dreer's Standard, Clay Rose, Green Mountain, and Rural No. 2.

The previous crop was turnips. There was no injury from rot. The yield has been estimated in each case from the product of one row 66 feet long.

All varieties were planted on rich black loam on May 20 and dug September 30.

POTATOES—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	Average Size.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Enormous	Strong..	Medium.....	557	20	447	20	110	..	Roundish white.
Houlton Rose.	" ..	"	487	40	436	20	51	20	Long, round, white.
Burnaby Seedling.....	" ..	" to large.	476	40	421	40	55	..	Flat, oval, pink.
White Beauty	Fair., ..	"	473	..	377	40	95	20	" white.
Cambridge Russet.....	Strong..	"	473	..	403	20	69	40	Long, round, deep russet..
Empire State.	" ..	" to large.	454	40	399	40	55	..	" white.
Early White Prize.....	Fair.. ..	"	447	20	377	40	69	40	Round, oval, light pink.
Prolific Rose.....	" ..	" to large.	436	20	315	20	121	..	" deep pink.
Delaware.....	Strong..	" " ..	429	..	396	..	33	..	Long, oval, white.
Hale's Champion.....	Fair.. ..	"	432	40	326	20	106	20	Roundish, oval, white.
Seedling, No. 230.....	" ..	" to large.	432	40	315	20	117	20	" "
Pearce's Extra Early....	" ..	" " ..	429	..	341	..	88	..	Long, flat, deep pink.
Sharpe's Seedling.....	" ..	"	425	20	352	..	73	20	Long, oval, light pink.
Maule's Thoroughbred...	" ..	"	421	40	352	..	69	40	" deep pink.
Seedling, No. 7.....	Strong..	" to large.	421	40	330	..	91	40	" deep red.
Great Divide.....	" ..	Small to medium	418	..	326	20	91	40	Irregular, white.
American Wonder	" ..	Large	403	20	366	40	36	40	Long, round, white.
Pride of the Market.....	" ..	Medium to large.	392	20	348	20	44	..	Roundish, oval, white.
Early St. George.....	Fair.. ..	"	381	20	319	..	62	20	Long, oval, deep pink.
State of Maine.....	" ..	Small to medium	381	20	330	..	51	20	Flattish, oval, white.
New Queen.....	" ..	Medium	381	20	311	40	69	40	Long, round, light pink.
Carman, No. 3	" ..	" to large.	374	..	315	20	53	40	" white.
New Variety, No. 1.....	Weak ..	" " ..	370	20	315	20	55	..	Irregular, white.
American Giant.....	Fair.. ..	"	363	..	311	40	51	20	Round, oval, white.
Early Harvest.....	Strong..	" to large.	363	..	311	40	51	20	Roundish, white.
Irish Daisy.	" ..	"	355	40	297	..	58	40	Long, oval, white.
Rose, No. 9.....	" ..	"	355	40	326	20	29	20	Long flat, deep pink.
Country Gentleman.....	Fair.. ..	" to large.	352	..	322	40	29	20	Long, deep pink.
Irish Cobbler	" ..	" " ..	352	..	282	20	69	40	Flattish, white.
I. X. L.....	Strong..	" " ..	352	..	304	20	47	40	Long, round, light pink.
Lizzie's Pride.....	" ..	" " ..	348	20	275	..	73	20	Irregular, white.
Vanier.	Fair.. ..	Small to medium	348	20	238	40	110	..	Round, oval, deep pink.
Rural, No. 2.....	Strong..	Medium to large.	341	..	308	..	33	..	Flattish, oval, white.
Bill Nye.....	Weak ..	Small to medium	337	20	278	40	58	40	Round, oval, white.
Lee's Favorite	Fair.. ..	" " ..	337	20	249	20	88	..	Long, oval, light pink.
Chicago Market.....	" ..	" " ..	333	40	198	..	135	40	Long, round, white.
Early Rose.	" ..	"	333	40	271	20	62	20	Round, pink.
Early Sunrise.....	Weak ..	Large.....	330	..	282	20	47	40	Long, oval, light pink.
Uncle Sam.....	Fair.. ..	Medium to large.	330	..	300	40	29	20	Flattish, oval, white.

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POTATOES—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	Average Size.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Money Maker	Strong..	Small to medium	330	..	234	40	95	20	Round, oval, white.
Quaker City	" ..	Medium to large.	326	20	267	40	58	40	Long, flat, white.
Canadian Beauty	" ..	" " ..	326	20	264	..	62	20	Long, round, light pink.
Polaris.....	Fair..	Small to medium	322	40	242	..	80	40	Long, oval, deep pink.
Holborn Abundance...	Strong..	Medium to large.	319	..	282	20	36	40	Round, white.
Daisy	Fair..	Small to medium	319	..	238	20	80	40	Long, oval, light pink.
Rawdon Rose.....	" ..	Medium.....	315	20	238	20	77	..	Round, oval, light pink.
Seattle.....	" ..	" to large.	315	20	223	40	91	40	Long, flat, light pink.
Early Michigan	Weak ..	" ..	315	20	245	40	69	40	" white.
Late Puritan.....	Fair..	" to large.	315	20	275	..	40	20	Long, round, white.
Clay Rose.....	Strong..	" ..	315	20	260	20	55	..	Flat, oval, deep pink.
Sabean's Elephant	" ..	" to large.	311	40	249	20	62	20	Long, round, white.
Sir Walter Raleigh.....	Fair....	Small to medium	311	40	278	40	33	..	Flat, oval, white.
Brownell's Winner.....	" ..	Large	308	..	249	20	58	40	Irregular, deep pink.
Earliest of All.....	Weak ..	Small to medium	304	20	249	20	55	..	Long, oval, light pink.
Clarke's No. 1.....	Fair....	Medium to large.	297	..	227	20	69	40	Long, flat "
Vick's Extra Early.....	" ..	Small to medium	297	..	256	40	40	20	Flat, pink.
Thorburn	" ..	Medium to large.	293	20	256	40	36	40	Roundish, light pink.
Early Six Weeks.....	Weak ..	" ..	293	20	242	..	51	20	" "
Early Puritan.....	Fair....	Medium.....	293	20	238	20	55	..	Long, round, white.
General Gordon.....	" ..	" to large.	289	40	201	40	88	..	" " deep pink.
Early Andes.....	Weak ..	Small to medium	289	40	242	..	47	40	Round, oval, white.
Penn Manor.....	Fair....	Medium to large.	289	40	234	40	55	..	Long, oval, deep pink.
Maggie Murphy.....	" ..	" ..	286	..	234	40	51	20	Flat, oval, light pink.
Northern Spy.....	Strong ..	Medium.....	282	20	238	20	44	..	Long, flat, deep pink.
Everett.....	" ..	" to large.	282	20	234	40	47	40	Long, oval "
Dreer's Standard.....	Fair....	" " ..	282	20	238	20	44	..	Flattish, oval, white.
Pearce's Prize Winner...	" ..	Small to medium	278	40	216	20	62	20	" "
McIntyre	Strong ..	" ..	278	40	245	40	33	..	Long, round, white.
Reeve's Rose.....	Fair....	Medium to large.	278	40	220	..	58	40	Flat, oval, light pink.
Early Norther.....	" ..	" ..	275	..	212	40	62	20	Long, flat, pink.
Ohio Junior.....	Weak ..	Medium.....	271	20	227	20	44	..	Round, oval, light pink.
Beauty of Hebron.....	" ..	" ..	271	20	212	40	58	40	Long, round "
Green Mountain.....	Fair....	Small to medium	271	20	227	20	44	..	Flattish, oval, white.
Early Market.....	Weak ..	Medium to large.	271	20	227	20	44	..	Round, oval.
Rochester Rose.....	Fair....	Small to medium	271	20	198	..	73	20	Long, round, light pink.
Flemish Beauty.....	" ..	Medium to large.	267	40	201	40	66	..	Oval, deep pink.
Swiss Snowflake.....	" ..	Small to medium	260	20	198	..	62	20	Irregular, white.
Bovee	Weak ..	" ..	249	20	176	..	73	20	Long, oval, light pink.
Brown's Rot Proof.....	Fair....	Medium to large.	245	40	183	20	62	20	Round, oval, deep pink.
Rural Blush	Strong ..	Small to medium	238	20	198	..	40	20	" "
Troy Seedling	" ..	" ..	238	20	150	20	88	..	Irregular, white.
Up to Date.....	" ..	Small	234	40	194	20	40	20	Flat, round, white.
Carman No. 1.....	" ..	Medium to large.	231	..	183	20	47	40	Flat, white.
Early Ohio.....	Weak ..	" ..	231	..	168	40	62	20	Round, oval, light pink.
Dakota Red.....	Fair....	Small to medium	223	40	190	40	33	..	Long, flat, deep pink.
Reading Grant.....	Weak ..	" ..	220	..	161	20	58	40	Round, oval, deep pink.
Prize Taker.....	Fair....	" ..	205	20	146	40	58	40	" "

AVERAGE results of a Five Years' test of twelve varieties of potatoes.

Variety.	Years included.	Average yield per acre.	
		Bush.	Lbs.
Seedling No. 7.....	1898-99, 1900-01-02	442	56
State of Maine.....	1898-99, 1900-01-02	438	54
Delaware.....	1898-99, 1900-01-02	438	20
I. X. L.....	1898-99, 1900-01-02	423	52
Dreer's Standard.....	1898-99, 1900-01-02	406	16
Quaker City.....	1898-99, 1900-01-02	399	56
Brown's Rot Proof.....	1898-99, 1900-01-02	395	16
Late Puritan.....	1898-99, 1900-01-02	387	56
Clay Rose.....	1898-99, 1900-01-02	387	56
Green Mountain.....	1898-99, 1900-01-02	379	8
Chicago Market.....	1898-99, 1900-01-02	368	52
Rural No. 2.....	1898-99, 1900-01-02	351	16

COLORADO POTATO BEETLE.

On August 6, numerous potato bugs appeared on about a dozen vines. They were at once sprayed with a liquid composed of a teaspoonful of Paris green mixed with one pail of water. The mixture was kept well agitated while being applied. The treatment was effectual and no further trouble was experienced. This is the third time these beetles have appeared on the Experimental Farm, but in no instance has the injury been serious.

GRASSES AND CLOVERS.

The past season has been a favourable one for all cultivated grasses. The shallower marshes also produced abundant crops of wild hay, but the deeper marshes were too wet for the best results. On the Experimental Farm the more recent sown test plots of grasses and clovers, were destroyed, but the older plots gave a very fair return ; considering the length of time they have been sown.

The crop of Austrian Brome Grass is usually a heavy one. It lies very compact and during unsettled weather is difficult to cure properly. A trial has been made of mixing it with western rye grass, with promising results, by mixing the seed in equal proportions and cutting the crop as soon as the rye grass heads out, the mixture lies open in the swarth and cures quickly. It is found however that most horses prefer the brome, and if fed a large quantity of the mixture at a time they will pick out the brome and leave the rye grass.

One plot of alfalfa and brome mixed, was grown. Originally it was one-quarter brome and three-quarters alfalfa, but the brome has gradually crowded out the alfalfa and the plot is now more than one-half brome. Alfalfa has usually proven hardy here, when sown alone. It then forms a strong plant before winter, but when sown with a nurse crop of grain, the plants are stunted and always winter killed. The same rule applies to red clover, alsike and white Dutch clovers.

A large number of fresh test plots of clovers and grasses have been sown and when winter set in nearly all of them had made a good stand. The clovers covered the ground thickly and the larger varieties could have been cut for hay, but it was thought advisable to leave the first years crop to retain the snow. For the same reason it is not a good plan to pasture clover late in the fall.

Between forty and fifty tons of hay were grown on larger fields.

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Grasses sown on spring-ploughed stubble, without a nurse crop, size of plots one-tenth acre. Soil a sandy loam.

Variety.	When sown.	Seed per acre.	Yield of cured hay per acre.	
		Lbs.	Tons.	lbs.
Austrian Brome.....	1898	12	1	100
" ".....	1899	12	2	500
" ".....	1900	12	2	500
Timothy.....	1900	7	1	50
Alfalfa and Brome.....	1900	15 & 7	2	400

MILLETS.

These useful annual fodder plants have given a very fair return this year. The abundant rainfall and open autumn has been favourable to them.

All the varieties were sown in drills seven inches apart. Most of the millets are quite easy to cure and stack.

The size of the plots was one-twentieth acre and the soil was a rich clay loam and the previous crop was fodder corn. All were sown on June 6 and cut on September 4.

Variety.	Height.	Length of Head.	Stage when Cut.	Yield per Acre, Green.	
				Tons.	Lbs.
Moha Hungarian.....	43	5 inches...	Fully headed..	7	800
Pearl or Cat Tail.....	42	None.....	Not headed...	5	800
White Round Extra French.....	55	".....	Not headed...	8	800
Algerian or Early Pearl.....	69	4½ inches.	½ headed.....	12	1,600
Italian or Indian.....	44	12 " .	Few heads....	12	800
Common	36	4 " .	Fully headed..	4	1,800

BROOM CORN.

This was sown in rows three feet apart on June 6 on a rich clay loam. The space occupied was one-twentieth of an acre. The crop grew to a height of 56 inches before cutting on September 4. This was partly headed, to the extent of about five inches and produced at the rate of 14 tons of green fodder per acre.

AMBER SUGAR CANE.

The amber sugar cane was also grown in rows three feet apart on rich clay loam. It was sown June 6 on a one-twentieth acre plot and cut September 4. The plants grew to a height of over five feet but were not headed at time of cutting. This produced at the rate of 10 tons of green fodder per acre.

HORSE BEANS.

The returns from horse beans were above the average, and the plants were well podded.

Two plots were sown of one-fortieth of an acre each. The seed was put in with a garden drill and kept clean by the occasional use of a cultivator. The soil was a clay loam, summer-fallowed.

Both were sown on June 5, and cut on September 6.

	Height.	Length of Pod.	Condition when Cut.	Yield per Acre.	
				Tons.	Lbs.
Horse Beans.....	36	4	Green.....	10	1,200
" "	36	4	"	9	1,900

EXPERIMENTS IN FEEDING STEERS.

SPELTZ STRAW COMPARED WITH BROME GRASS (BROMUS INERMIS) AND WESTERN RYE GRASS (A. TENERUM).

Twelve steers were purchased for this experiment but one of them becoming sick before the test started, only three were used in one of the groups. All were two-year old grades, Shorthorn blood apparently predominating.

When purchased in December, 1901, the steers cost \$3.25 per hundred, and they sold in May, 1902, for \$5.12½ per hundred pounds. At that time the two lots fed with hay were choice export cattle, but the animals fed with Speltz were not fully finished, and in a discriminating market would not have brought within a cent of the top price.

The result of the experiment would lead us to the following conclusions:—

1st. That Western Rye Grass hay and Brome Grass hay are about equal in feeding value for beef.

2nd. That Speltz straw makes very fair coarse fodder but is only worth one-half as much as well cured hay.

RATION FED.

During the first four weeks, Dec. 30, 1901, to Jan. 27, 1902, each steer received per day :

Either Brome hay, Western Rye hay or Speltz straw....	20 pounds
Swede turnips.....	20 "
Chop.....	6 "

During second four weeks, Jan. 27 to Feb. 24, 1902, each steer received per day :

Either Brome hay, Western Rye hay or Speltz straw....	20 pounds
Swede turnips.....	20 "
Chop.....	8 "

During third four weeks, Feb. 24 to March 24, each steer received per day :

Either Brome hay, Western Rye hay or Speltz straw....	20 pounds
Swede turnips.....	20 "
Chop.....	9 "

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During the fourth four weeks, March 24 to April 21, each steer received per day:

Either Brome hay, Western Rye hay or Speltz straw	20 pounds
Swede turnips	20 "
Chop	11 "

DESCRIPTION OF FODDER.

The Brome and Western Rye hay were cut early and well cured. The Speltz straw was cut as soon as the grain was ripe and had a clean and bright appearance. The chop consisted of one-half oats, one-quarter barley and one-quarter wheat screenings.

COMPARATIVE GAINS.

Brome Grass Hay.	Date.	Weight.	Gain.	Total Gain.
Original weight of four Steers	Dec. 30	5,325 lbs. . . .		
Weight end of 1st period	Jan. 27	5,500 "	175 lbs.	
" 2nd "	Feb. 24	5,555 "	55 "	
" 3rd "	Mar. 24	5,770 "	215 "	
" 4th "	Apr. 21	6,000 "	230 "	675 lbs.
Western Rye Grass Hay.	Date.	Weight.	Gain.	Total Gain.
Original weight of four Steers	Dec. 30	5,320 lbs. . . .		
Weight end of 1st period	Jan. 27	5,424 "	104 lbs.	
" 2nd "	Feb. 24	5,530 "	106 "	
" 3rd "	Mar. 24	5,720 "	199 "	
" 4th "	April 21	5,980 "	260 "	669 lbs,
Speltz Straw.	Date.	Weight.	Gain.	Total Gain.
Original weight of three Steers	Dec. 30	3,960 lbs. . . .		
Weight end of 1st period	Jan. 27	4,062 "	102 lbs.	
" 2nd "	Feb. 24	4,072 "	10 "	
" 3rd "	Mar. 24	4,183 "	111 "	
" 4th "	April 21	4,315 "	132 "	355 lbs.

COST OF FEEDING EACH LOT OF STEERS.

Lot 1.—Brome grass hay.

8,480 lbs. at \$5 per ton	\$21 20
142 ² / ₃ bushels turnips at 5 cents per bushel	7 14
3,568 lbs. chop at 75 cents per hundred lbs.	26 76
Total cost for four steers	\$55 10
Cost per steer	\$13 77

Lot 2.—Western rye grass hay.

8,400 lbs. rye grass hay at \$5 per ton	\$21 00
141 $\frac{1}{3}$ bushels turnips at 5 cents per bushel.....	7 07
3,500 lbs. chop at 75 cents per hundred	26 25
Total cost for four steers.....	<u>\$54 32</u>
Cost per steer.....	\$13 58

Lot 3.—Speltz straw.

4,995 lbs. speltz straw at \$2.50 per ton.....	\$ 6 25
111 bushels turnips at 5 cents per bushel.....	5 55
2,832 pounds chop at 75 cents per hundred.....	21 24
Total cost for three steers.....	<u>\$33 04</u>
Cost per steer.....	\$11 01

SUMMARY OF RESULTS.

	First Cost per Steer.	Value of Feed Consumed.	Price per Steer Sold for.	Profit per Steer.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Fed Brome Grass Hay.....	43 26	13 77	76 87	19 84
Fed Rye Grass Hay	43 22	13 58	76 61	19 81
Fed Speltz Straw.	42 90	11 01	73 69	19 78

EXPERIMENTS WITH SWINE--LAMB'S QUARTER SEED AS PIG FEED.

This test was made to ascertain whether a ration composed partly of Lamb's Quarter Seed *Chenopodium album* had any advantage over a pure grain ration.

The Lamb's Quarter seed was boiled and then after being well mixed with the chopped grain was fet wet. The grain was a mixture composed of one-half oats, and one-quarter each of barley and wheat screenings.

The four pigs used for this test were Tamworth crosses. They were fed 76 days and sold at \$5.50 per hundred pounds, live weight.

From the result of this experiment it would appear that Lamb's Quarter seed has a limited value as food for pigs. The annual report of the Experimental Farms for 1899, page 147, contains an analysis of this seed.

RATION FED.

Amount and value of food consumed by each pen during the 76 days of the test, the grain is valued at 75 cents per hundred pounds.

	Lamb's Quarter Seed.	Gain.	Value of feed.
	Lbs.		\$ cts.
Pen 1, fed Lamb's Quarter Seed.....	216	950	7 12
Pen 2, without " "		1,125	8 43

POTATOES AND TURNIPS AS PIG FEED.

RATION fed during the fattening term of 82 days, from August 28 to Nov. 18.

SUMMARY.

	Weight when bought.	Value when bought.	Weight when killed.	Value when killed.	Value of food.	Profit on each pair.
	Lbs.	\$ cts.	Lbs.	\$ cts.	\$ cts.	\$ cts.
Pen 1, fed roots.....	171	10 26	372	22 32	8 28	3 78
Pen 2, without roots... ..	177	10 62	372	22 32	7 33	4 37

REPORTS FROM PARTIES SUPPLIED WITH SWINE.

This fall circular letters were sent out to parties supplied in former years with young pure bred pigs. Eleven replies have been received to date. The following extracts will show that the animals have given good satisfaction.

Name of Purchaser.	Address.	Extract from Reports.
J. W. Dimmick.....	Kerfoot	Boar has given me great satisfaction.
S. T. Smith.	Hamiota... ..	I think the sow has no equal.
R. G. Penson.....	Melita.....	Sows are doing first rate.
I. Cookman... ..	Basswood.....	Will make a very fine hog.
G. W. Marsden	Brandon.....	Has done very well and will make a fine hog.
L. W. Speers.	Westwood	She is a fine animal.
G. A. Edwards.....	Kerfoot.	I am well pleased with him.
A. E. Brown.	Hamiota.....	She made a good growth, has eleven pigs in one litter.
H. W. Phillips.....	Pipestone....	The hog has done finely and we are well satisfied with it.
S. A. Coxe, V.S	Brandon.....	A very fine animal, I am well pleased with it.
J. Kirkealdy.....	do	A fine pig and doing well.

BROOD SOWS.

In the early history of this farm the brood sows were kept housed during the winter months in well bedded pens 9 x 9 feet, and only allowed the use of runways during fine weather, with the result that the litters of young pigs were generally small and weak. Of late years all the brood sows are allowed to run as will in a large yard, provided with a stack of straw for their bed; and they are only brought into the barn a week or two before the litters are due. Since this plan has been adopted the sows have averaged ten pigs per litter and nearly every one of them has been strong and vigorous from the start.

POULTRY.

The flock of fowls on this farm have kept in good health during the year. Seventy-three chickens were hatched by hens in the spring, of these only three died during the summer. The flock now consists of 54 Light Brahmas, 24 Barred Plymouth Rocks and 14 White Wyandottes.

Some feeding experiments were commenced this fall but were not completed in time to be included in this report.

BEES.

Of the ten hives placed in the cellar last fall, two died, one strong colony from inadequate stores, the other from some unexplained cause.

They were placed on the stands on April 15 and commenced at once to gather pollen from the willow and hazel. The colonies were weighed in the fall and again in the spring and it was found that they had consumed on an average $14\frac{1}{2}$ pounds of honey per colony.

The spring was too wet and cool for much nectar gathering. It was found that very few of the bees left the hive when the temperature was below 50 degrees Fah. in the shade. We notice that the bee's preference for a particular blossom is not at all constant; one year they work freely on a certain plant and the next year neglect it. This year they worked freely on wild plums and on small fruits, the former being fairly alive with them at times.

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The demand for colonies being large the apiary was run for swarms more than for honey and only about 25 pounds of honey per colony were taken. Sixteen swarms were obtained during the season. These found ready sale at five dollars per colony. Twelve hives were placed in the cellar on November 15.

HORTICULTURE.

APPLES.

Orchard of Siberian Crab (Pyrus baccata).—It is with pleasure that we record one of the best crops of this fruit yet harvested on the Experimental Farm. The trees were covered with bloom in the spring and the total absence of spring frosts, resulted in a splendid set of fruit in many instances so heavy was the crop that the branches of the trees were bent down under the weight. The most notable feature of this fruit is its extreme variability, specimens of the same variety ranging in size from that of a fair sized pea to a size nearly as large as the Transcendent Crab. While it is proposed to continue the growing of the larger kinds—the small fruited trees have been reserved for top grafting with improved varieties. The varieties of *Pyrus* grown in this orchard consist of the following:—

Pyrus baccata edulis, *P. b. macrocarpa*, *P. b. microcarpa*, *P. b. lutea*, *P. b. sanguinea*, *P. b. aurantiaca*, *P. b. genuina*, *P. b. cerasiformis* and *P. b. yellow*. *Pyrus prunifolia*, *P. p. xanthocarpa*, *P. p. intermedia* and *Pyrus malus* No. 529.

The most promising of these which have yet fruited are among *P. b. sanguinea*, *Pyrus prunifolia* and *Pyrus prunifolia xanthocarpa* and even these show very great variation in individual trees—Following will be found a list of the most promising trees.

Pyrus baccata sanguinea No. 15.—Fruit, rosy red when ripe, and produced in great profusion, depth 1 inch, ripe August 15. Of a mealy consistency though pleasant flavour, sweet, calyx in about 75 per cent of the fruit persistent, makes a first class jelly.

Pyrus baccata sanguinea No. 16.—Colour light red on sunny side light green on opposite. Ripe August 25, flavour pleasantly acid and juicy. Calyx entirely persistent a very good variety.

Pyrus prunifolia xanthocarpa No. 17.—This was the largest of the pyrus yet fruited having a diameter of $1\frac{1}{2}$ inches. The colour of the fruit is a deep green and was not fully ripe before frost.

Pyrus baccata yellow No. 18.—The fruit of this variety is of a deep yellow colour all over, and is about the same size as *Pyrus baccata sanguinea* No. 15. The flesh is pleasantly sub-acid and very juicy.

CRAB APPLE SEEDLINGS.

In the *Pyrus* orchard there has been grown a number of seedlings from the following Crabs—Martha, Transcendent, Rose of Stanstead, Snyder, Gideon, and Jumbo. The four last mentioned having proven too tender for us here, have all been destroyed except one or two of the most promising trees of each variety, left for further test. The Transcendents have shown themselves somewhat hardier, although many of these have repeatedly been killed back. The seedlings of Martha are however most promising. Most of them have been quite hardy since planting, make very shapely trees, and this year three of them fruited—following is a brief description of each of these three sorts.

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Martha Seedling No. 1.—Tree a vigorous grower very shapely and hardy. Fruit light yellow in colour when ripe, with the faintest suggestion of red on the sunny side. Shape flattish, calyx persistent, flavour very sweet and juicy, almost comparable to Transcendent; an abundant bearer, about two-thirds the size of the Transcendent crab—altogether a most satisfactory variety. Ripe about the middle of August.

Martha Seedling No. 2.—Tree fairly vigorous, though somewhat more spreading than the former and hardy. Fruit deep yellow in colour with bright red streaks on sunny side. Shape conical or elongated, and slightly ribbed. Calyx persistent. Flavour slightly astringent and drier than the former, rather large seed cavity, fairly productive and of about an equal size with the former. Ripe early in September.

Martha Seedling No. 3.—Tree fairly vigorous and shapely, quite hardy, fruit deep yellow throughout when ripe. Shape quite flat, calyx persistent. Flavour sweet but somewhat dry, small seed cavity (only a few fruits were produced this season) slightly smaller than the preceding varieties. Ripe middle of August.

TONKA APPLE.

One tree of this variety mentioned in last year's report set a few specimens of fruit, which were stolen long before they reached maturity. These incidents are extremely regrettable and make our work in these lines very difficult.

TOP GRAFTING.

A considerable amount of grafting was accomplished during the past spring—and results were very satisfactory. Scions were received from Mr. H. L. Patmore, nurseryman of this city consisting of Duchess, Wealthy, Pride and Transcendent. These were top grafted on the stocks of *Pyrus baccata*, and nearly all made a good union. The seasons growth averaging two to two and one-half feet. The scions were taken from trees which have successfully withstood the test of several winters—and it is hoped they will prove hardy with us. The operation commenced as soon as the wax could be worked in the open, and continued at intervals until the buds expanded. It would appear from the results that early grafting is desirable. Considerable root grafting was also done with Tonka and Wealthy apples on *Pyrus baccata*.

TRANSCENDENT CRAB.

The tree of Transcendent crab growing on Hillside Plot mentioned in previous reports came through the winter of 1901–2 unscathed and a fine crop of fruit was set. The product was an unusually fine sample of this crab, rather above the average Manitoba grown Transcendent in size, and entirely free from any disease. This specimen has now proven hardy for several years, but this is the first time that any fruit has matured. Ripe about August 25.

PLUMS.

Although the plum trees, set exceptionally well the past spring (owing to the absence of spring frosts) a large proportion of the crop was destroyed by the fungus disease (plum pocket). The coolness of the season greatly retarded the ripening, and although a fair crop of the native plum (*Prunus nigra*) was harvested, the imported varieties (*Prunus americana*) failed to produce ripe fruit. A careful examination of

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all the bearing trees was made, and undesirable ones were marked for grafting with the more promising varieties.

A particularly fine native plum seedling fruited this year. The fruit is small, light red in colour, flavour good, skin thin, and it ripens earlier than any other variety grown here. It has been named 'Brandon Ruby.'

RASPBERRIES.

Raspberries were again a very poor crop, so much so as to prevent any comparison of yield. The fact has now been clearly demonstrated that their present position (on the hill-side) is entirely unsuited to them, and arrangements have been made to commence a new plantation in a different location. Following will be found a list of varieties under trial, together with notes as to the manner in which they came through the winter of 1901-2. All made good growth this season and on the approach of winter one-half of each variety was laid down and covered, the balance being left standing in order to make comparisons on the two methods of wintering.

Biggar's Seedling, wintered fairly well. Muskingum and H. R. Antwerp, killed to ground. Royal and Clark, wintered well. Sir John, Hansel and Palmer, killed to ground. R. B. Whyte, wintered fairly well. Yellow Antwerp, killed to ground. Lutea, wintered well. Sharpe, wintered fairly well. London, wintered well. Louisa Bonn, wintered fairly well. Large Red, wintered well. Kenyon's Seedling, wintered fairly well. Phoenix, Parnell, Niagara, Thompson's Early and Trusty, wintered well. Hebner, killed back one-half. Schaffer's Colossal, killed to ground. Champion, wintered well. Fontenay, wintered fairly well. Garfield, Carleton, Empire, Cuthbert and Sarah, killed to ground. Turner, killed back one-half. Hilborn and Philadelphia, wintered well. Caroline, killed back one-half. Marlboro, Golden Queen and Dr. Reider, wintered well. Mary, killed back three-quarters.

CURRANTS.

The currant crop was again a small one. The present position of the plantation seems unsuitable and a new plot will be commenced next spring. While some of the red and white varieties gave a fair yield, the black currants produced hardly any fruit. Following will be found a list of varieties on trial, together with notes on their condition in the spring of 1902 :

BLACK CURRANTS.

Climax, wintered well. Standard, killed to ground. Stirling, killed back one-half. Black Champion, Lee's Prolific and Prince Albert, wintered well. Madoc wintered fairly well. Monarch, killed to ground. Eagle and Ontario, wintered well. Eclipse, killed back one-half. Orton killed to ground. Perth wintered fairly well. Beauty, wintered well. Oxford, killed back one-half. Victoria, wintered well. Charmer, killed to ground. Clipper, wintered well. Winona, killed back one-fourth. Ethel, killed back three-fourths. Lewis, killed to ground. Stewart and Crandall's Black, wintered well. Black Naples, killed back one-half. Perry, wintered fairly well. Black Champion, killed back three-fourths. Lee's Prolific, wintered fairly well. Of the red and white varieties North Star, Fay's Prolific, Cherry, Raby Castle and Red Dutch, wintered well. Fertile D'Angers and La Versailles, wintered fairly well. Victoria, killed to ground. Charter, Pomona, Red Grape, Mammoth Red, White Imperial, White Dutch and White Grape, wintered well.

CURRENTS.

The following table shows the comparative yields of the varieties which fruited :—

Variety.	Colour.	Yield per Bush.
		Lbs.
Victoria.....	Red.....	5
Raby Castle.....	".....	3½
Red Cherry.....	".....	14
White Dutch.....	White.....	9½
Charter.....	Red.....	3
North Star.....	".....	7
La Versailles.....	".....	½
Fertile D'Angers.....	".....	2¼
Pomona.....	".....	11
Victoria.....	".....	5
White Grape.....	White.....	5½
Fay's Prolific.....	Red.....	1½

Current.—Crandall or Missouri Tree Current. This variety is a strong growing and large fruited sort, which has proven very desirable for Manitoba. The bush is thoroughly hardy producing in profusion large black berries (about twice the size of the ordinary black current) of good flavour, which make an excellent preserve. Owing to the shyness in fruiting of some of the black varieties here, and to the fact that they are somewhat tender, we would recommend this variety for more general trial in Manitoba. It has the disadvantage of ripening unevenly.

GOOSEBERRIES.

The Gooseberry crop was not a large one the past season. The Native Sand Hill Gooseberry gave a fair crop of small berries, and the following varieties produced a small quantity of fruit, viz :—Houghton, Columbus and Red Jacket.

SAND CHERRIES (*Prunus pumila*).

This crop was a total failure the past season. All the fruit being destroyed by the fungus known as 'pocket.'

TREES AND SHRUBS IN ARBORETUM.

Very few additions were made to the Arboretum during the past season on account of the pressure of other work at planting time. During the past few years the growth of trees and shrubs has been so luxuriant that it was again found necessary to remove some hundreds of the trees to prevent overcrowding. In doing this work care was taken to leave the most valuable species. We regret that the Russian Poplar hitherto one of our fastest growing, and most satisfactory trees is now showing signs of degeneration. The limbs are affected with canker, which, first appearing as an excrescence, gradually rots through the limb, which then breaks off with the first heavy wind storm. Nearly all the specimens in the Arboretum are more or less affected.

Owing to the absence of spring frosts, the flowering shrubs made a magnificent display, the Lilacs especially calling forth the admiration of visitors.

Following will be found some brief notes on a few of the best varieties of flowering shrubs not already noticed in former reports.

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Berleris purpurea.—Though not perfectly hardy this shrub does fairly well when partially protected, and is well worth a trial, its purple foliage and orange red flowers, making a beautiful effect when interposed with other shrubs. Four or five feet high.

Spiraea ulmifolia.—This spirea made a beautiful show during the past season, the shrubs being literally covered with racemes of beautiful white flowers. Three to four feet high, quite hardy.

Spiraea sorbifolia.—A very fine late blooming spirea. The foliage is very ornamental, this coupled with the symmetry of the plant and the large spikes of pinkish white flowers, make it one of the best low growing flowering shrubs. Three to four feet high. Hardy.

Lonicera sempervirens.—A spreading variety of the honeysuckle of the trumpet type. The flowers of a brilliant scarlet are very striking and are produced for a considerable length of time, hardy.

Diervilla lutea.—Though this is not thoroughly hardy, partially killing back each season yet as it invariably flowers it is worthy of cultivation. The yellow trumpet flowers, together with its handsome foliage make it very attractive. One to two feet in height.

Rosa villosa pomifera.—A large flowering single rose of a deep red colour, the flowers being succeeded by large and handsome fruit. Height 3 to 4 feet. Hardy.

Philadelphus.—For the first time in the history of the farm two varieties of this beautiful shrub produced a few flowers—viz., *P. deutziflorus* and *P. grandiflorus*. The flowers of these two varieties are almost identical except in size *P. grandiflorus* being about twice the size of the former, and possesses a most delicate perfume. These shrubs always kill back to near ground, and an effort has been made this autumn to bring them through the winter by protection.

AVENUES.

The avenue trees made a fair growth during the season of 1902. The maples however were badly infested with a variety of Aphis during the latter part of the season, which somewhat checked growth—and caused an unusually early ripening of the wood—The trees were heavily laden with seed, a small percentage of which was damaged by the fungus disease first noticed last year, the bulk of the seed however is of good quality. The spruce trees on the east avenue made an exceptionally luxuriant growth.

PLANTING OF SPRUCE.

The bluff immediately south of the Barn which was cleared of undergrowth two years ago, and which consists principally of Native Oak (*Quercus macrocarpa*) was improved this season by the planting of a number of Spruce (*Picea alba*) which were brought from the Carberry swamp in 1900. The young trees appear to be well established and if they succeed well in a few years will add to the beauty of this plantation.

PROPAGATION.

Cuttings of the following which were made in the fall of 1901, were planted the past spring.

16—20½

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	Percentage struck.
Salix laurifolia.....	90 per cent.
“ Nicholsonii purpurascens.....	25 “
“ pentandra.....	20 “
Populus bereolinensis.....	55 “
“ argentea.....	5 “
Vitis quinquefolia.....	85 “

PROPAGATION OF TREES AND SHRUBS FOR DISTRIBUTION.

An increased number of trees and shrubs have been grown for free distribution. In most cases the seed or cuttings have been grown on the Experimental Farm. The seed of the larger trees and shrubs was sown in the open field, in drills three feet apart. The smaller shrubs were grown in seed beds and the drills made one foot apart. The following list includes most of the varieties grown: Native Ash-Leaf Maple, Caragana, Bush Honeysuckle, Sand Cherries, Lilacs.

PROPAGATION OF TREES FOR THE FORESTRY BRANCH OF THE DEPARTMENT OF THE INTERIOR.

The 110,000 trees grown here for the above department were distributed last spring, and I understand have given very general satisfaction. This year a much larger area was sown with various tree seeds, and the following list gives the number of trees raised from seed. These are nearly all large enough for distribution next spring.

Ash Leaf Maple (native).....	512,000
Green Ash.....	310,000
White Elm.....	50,000
	<hr/>
	876,000
	<hr/>

HEDGES.

The large maple hedges surrounding the shelter blocks, made good growth during the past season and show no signs of deterioration. This also applies to the large hedges of Native Spruce (*Picea alba*) and *Caragana arboreescens* (Siberian Pea Tree). The Lilac hedge surrounding the Pyrus orchard south of the barn flowered heavily last spring, and was a source of admiration to all passers by. The following varieties have proven unsuitable for hedge purposes and they have been destroyed:—

Rosa Rugosa, *Ligustrum amurense* (Amur Privet), *Spiraea Douglasii* (Douglas' Spirea), *Lonicera Albertii* (Albert's Honeysuckle), *Populus deltoida* (Cottonwood), *Salix laurifolia* (French Laurel-leaved Willow), *Rosa rubrifolia* (Red Leaved Rose).

From the results obtained since planting the sample hedges in 1898, the following appear to be the most satisfactory as ornamental hedges:—

Pyrus baccata aurantiaca (Siberian Crab), *Shepherdia argentea* (Buffalo Berry), *Syringa Josikea* (Josika's Lilac), *Crataegus coccinea* var. *Sullivantii* (Native Thorn), *Acer Ginnala* (Asiatic Maple). *Rhamnus frangula* (Breaking Buckthorn), *Salix Brit-*

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zensis (Willow), *Larix americana pendula* (Tamarack), *Caragana arborescens* (Siberian Pea Tree), *Picea alba* (Native White Spruce), *Salix laurifolia* (true) (Laurel-leaved Willow). *Prunus pennsylvanica* (Pin Cherry), *Cornus stolonifera* (Dogwood), *Syringa vulgaris* (Common Lilac).

CATERPILLAR ON WILLOWS.

Early in August a number of willows in the propagating beds were attacked by a dark caterpillar, with bright spots along its body, probably the larva of a saw fly. Some of the branches were completely stripped of leaves before the insects were noticed. The plants were sprayed with a mixture of one teaspoonful of paris green to one pail of water. This destroyed the insects at once and the plants soon recovered.

THE VEGETABLE GARDEN.

Despite the drawbacks resulting from the flood experienced on the farm this season, together with a disastrous cloudburst which occurred on June 1, the vegetable garden suffered comparatively little and the crops were quite up to the average. The month of April being very cool and dull with several snowfalls, outside sowing did not commence until May 25, when onions were sown, closing on May 28 with cucumbers and corn. The soil being very moist, the germination was exceptionally good, the rows showing a continuity (with the exception of some of the pease of weak vitality) not always experienced here. Following the custom adopted some years ago, three kinds of vegetables were tested in large variety, viz.:—Pease, Tomatoes and Cucumbers. The coolness of the season prevented the tomatoes from ripening, but the others named did exceptionally well, Onions, Beets, Cabbage, Cauliflower, Turnips, Lettuce, Carrots, Squash, Pumpkins and Corn, all gave good returns, and altogether the season was a favourable one for the vegetable garden.

Following will be found a record of portions of the work undertaken in this department:—

PEASE.

Forty-seven varieties of Garden Pease were sown on May 12 and 13, with hoe, in rows four feet apart, and the crop as a whole, was very satisfactory. The worst feature of the test was the lack of germinating power in many of the varieties due to Pea Weevil, especially those not grown extensively. This has been a source of annoyance, for some years past, with imported seed and emphasizes the desirability of growing our own seed, which is always free from this trouble. All varieties ripened, and the product has been harvested for use next season, the sample being a fine one. The earliest variety proved to be Extra Early Exonian. Champion of England being the last ready for table.

Appended is the result of the test arranged in order of earliness.

All were sown on May 12 and 13.

The germination of the following varieties was poor:—Thos. Laxton, Admiral Dewey, C.P.R., Yorkshire Hero, Telephone, Shropshire Hero, Champion of England, Laxton's Prolific, Long Pod, Rennie's Perfection and Duke of York.

Variety.	Length of Pod.	Length of Vine.	No. of Peas in Pod.	Productiveness.	Flavour.
	In.	In.			
Extra Early Exonian.....	2	18	4 to 5	Very productive..	Sweet.
S. B. Co.'s Extra Early	2	14	4 " 5	Fairly " ..	Fairly sweet.
Alaska.....	2 $\frac{1}{4}$	30	6 " 7	" " ..	"
McLean's Little Gem.....	2	18	5 " 6	" " ..	"
Bruce's Early Conquerer	2	26	4 " 5	Poor	Poor.
Extra Early Daniel O'Rourke	2	32	4 " 6	Very productive ..	"
Philadelphia Extra Early.....	2 $\frac{1}{2}$	36	6 " 7	Fairly " ..	"
Carter's First Crop	2 $\frac{1}{2}$	24	5 " 6	" " ..	Fairly sweet.
Tom Thumb.....	2 $\frac{1}{4}$	26	6 " 7	" " ..	"
Wm. Hurst.....	3 $\frac{1}{2}$	16	7 " 8	Very " ..	Very sweet.
American Wonder.....	2 $\frac{3}{4}$	15	6 " 7	Fairly " ..	Sweet.
Blue Beauty.....	2 $\frac{1}{2}$	18	5 " 6	" " ..	Fairly sweet.
Laxton's Alpha.....	2 $\frac{1}{2}$	28	6 " 7	" " ..	Sweet.
Prosperity or Gradus.....	3	36	4 " 5	Poor	Very sweet.
Gregory's Surprise.....	2 $\frac{1}{2}$	34	6 " 7	Fairly productive.	Fair.
Blue Imperial.....	2 $\frac{3}{4}$	24	5 " 6	" " ..	Poor.
Burpee's Profusion.....	2 $\frac{3}{4}$	36	7 " 8	Very " ..	Very good.
Horsford's Market Garden	2 $\frac{3}{4}$	34	6 " 7	" " ..	Good.
Large Crooked or Scimitar	6	60	Edible podded variety.		
Early Dwarf Brittany.....	5 $\frac{3}{4}$	30	"		
Allen's Dwarf Telephone	3 $\frac{1}{2}$	20	8 to 9	Fairly productive.	Very good.
C.P.R.....	3	18	5 " 6	Very productive..	"
Surprise.....	2 $\frac{1}{4}$	30	4 " 5	Poor	Sweet.
Admiral.....	2 $\frac{3}{4}$	36	6 " 7	Very productive..	Fairly sweet.
Rennie's Queen.....	3 $\frac{1}{4}$	30	8 " 9	Fairly " ..	Good.
Nott's Excelsior	2 $\frac{1}{2}$	12	7 " 8	Very " ..	Sweet.
McLean's Advancer.....	2 $\frac{3}{4}$	30	5 " 6	Fairly " ..	Fairly sweet.
Premium Gem.....	2 $\frac{1}{4}$	12	5 " 6	" " ..	Good.
Admiral Dewey.....	3 $\frac{3}{4}$	37	8 " 9	" " ..	Very fine.
Bliss' Everbearing.....	3 $\frac{1}{4}$	24	7 " 8	Very " ..	Fairly sweet.
McLean's Blue Peter.....	2 $\frac{1}{2}$	12	5 " 6	Fairly " ..	Sweet.
Laxton's Supreme.....	3 $\frac{1}{4}$	40	8 " 9	" " ..	Good.
Thomas Laxton.	3 $\frac{1}{4}$	32	6 " 7	" " ..	Very sweet.
Fillbasket	2 $\frac{3}{4}$	37	6 " 7	Very " ..	Good.
Rural New Yorker.....	2 $\frac{3}{4}$	30	5 " 6	Fairly " ..	Fair.
Pride of the Market.....	2 $\frac{5}{8}$	30	6 " 8	" " ..	Poor.
Laxton's Prolific Long Pod.....	3 $\frac{1}{4}$	24	7 " 9	Very " ..	Good.
Rennie's Perfection	3	30	6 " 7	Fairly " ..	Very good.
Telephone	3 $\frac{3}{4}$	36	7 " 8	" " ..	"
Stratagem..	3 $\frac{1}{4}$	24	7 " 9	Very " ..	"
Juno	3	28	8 " 9	" " ..	"
Prince of Wales.....	3 $\frac{1}{4}$	36	8 " 9	" " ..	Excellent.
Duke of Albany.....	3	40	7 " 8	Fairly " ..	Very good.
Yorkshire Hero.....	3 $\frac{1}{2}$	30	8 " 9	" " ..	Good.
Duke of York.....	3 $\frac{5}{8}$	36	8 " 9	Very " ..	Very good.
Shropshire Hero	3 $\frac{3}{4}$	32	8 " 9	Fairly " ..	"
Champion of England.....	3 $\frac{1}{2}$	40	8 " 9	" " ..	"

During the summer representatives of two extensive seed firms visited the farm for the express purpose of inquiring into the capabilities of the country for supplying seed pease on a large scale. After examining the large collection of varieties growing on the farm, and noticing the absence of pea weevil in the mature samples, they appeared favourably impressed with the prospects of the industry here.

CUCUMBERS.

Thirty-six varieties of this vegetable were sown in open ground on May 23, in hills three by five feet apart. With one exception the germination was good and a large crop of fruit was harvested. It is pleasing to note that on the Experimental Farm this crop is invariably a good one although the seed is sown directly in the open (the plan of starting the plants in the hotbed and transplanting not being resorted to). Following will be found a result of this test arranged in order of earliness, together with some notes, on those varieties that proved specially suitable.

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Variety.	Flavour and Texture.	Length.	Diameter.	Colour.	Smoothness.	Productiveness.
		In.	In.			
Siberian	Fair.. ...	5 $\frac{1}{4}$	2	Light green.	Spined	Very productive.
Early Frame	"	4 $\frac{3}{4}$	2 $\frac{1}{4}$	"	Sparsely spined...	"
Paris Prolific	"	7 $\frac{1}{4}$	2	Dark green.	Densely spined...	"
Early Green Cluster	"	6	2 $\frac{1}{4}$	Light green.	Moderately spined.	"
Boston Pickling	"	5 $\frac{1}{4}$	2	Dark green.	Densely spined....	Fairly productive.
Moronian or Russian	Poor.	4	2	Light green.	"	"
Short Green Gherkin... ..	Fair..	4 $\frac{3}{4}$	2	"	"	Very productive.
Extra Early Long Green....	Very good	8	2	Dark green.	Sparsely spined...	Moderately productive.
English Gherkin	Fair..	4 $\frac{1}{4}$	2 $\frac{1}{4}$	Light green.	"	Very productive.
Westerfield's Chicago Pick- ling		5 $\frac{1}{2}$	2	Dark green.	Densely spined...	"
White Wonder	Very good	6 $\frac{1}{2}$	2 $\frac{1}{2}$	White....	Sparsely spined...	"
Cool and Crisp	"	8 $\frac{1}{4}$	2 $\frac{3}{4}$	Dark green.	Heavily spined....	Fairly productive.
Cumberland	"	8	2	Light green.	Densely spined...	Very productive.
B's. Evergreen	"	7 $\frac{3}{4}$	2 $\frac{3}{4}$	"	Sparsely spined...	"
Short Green	Fair..	4 $\frac{5}{8}$	2 $\frac{3}{8}$	"	Densely spined....	"
Boston Market	Good.....	6 $\frac{3}{4}$	2 $\frac{1}{4}$	Dark green.	Sparsely spined...	"
Green Prolific	Very good	5	2 $\frac{1}{2}$	"	Densely spined....	"
Prize Prolific	"	9	2	"	"	"
Pride of Canada	"	9	2 $\frac{1}{2}$	White.....	Moderately spined.	"
Improved Long Green	"	7 $\frac{3}{4}$	2 $\frac{1}{2}$	Dark green.	Sparsely spined...	Moderately productive.
Commercial Pickle	Good.....	6 $\frac{1}{2}$	2	Light green.	Moderately spined.	Very productive.
Early Arlington White Spine	"	6	2 $\frac{3}{4}$	"	Sparsely spined...	Moderately productive.
Early White Spine	Very good	7 $\frac{3}{4}$	2 $\frac{3}{4}$	"	"	"
New Orleans Market	"	7 $\frac{1}{2}$	2 $\frac{1}{2}$	"	Densely spined....	Very productive.
Emerald	"	5 $\frac{1}{2}$	2 $\frac{1}{2}$	Dark green.	Spineless	"
Hill's Forcing White Spine.	"	7 $\frac{1}{2}$	3	Light green.	Sparsely spined...	"
Thorburn 1896 Pickler	Good.....	6 $\frac{3}{4}$	2 $\frac{1}{4}$	Dark green.	Moderately spined.	Fairly productive.
Jersey Pickling	Fair..	5	1 $\frac{3}{4}$	"	Densely spined....	Very productive.
New Toronto Pickling	Very good	6 $\frac{1}{2}$	2 $\frac{1}{4}$	"	Heavily spined....	Fairly productive.
Giant Pera	"	13	2 $\frac{1}{4}$	Light green.	Smooth	Not productive.
Japanese Climbing	Poor.	6 $\frac{1}{2}$	2 $\frac{3}{4}$	Deep green.	Sparsely spined...	Moderately productive.
Stockwood Ridge	Good.....	9	2 $\frac{1}{2}$	White....	Moderately spined.	Very productive.
Long Green Turkey	Very good	8 $\frac{1}{4}$	2 $\frac{3}{4}$	Dark green.	Sparsely spined...	Moderately productive.
White Pearl	"	10 $\frac{1}{2}$	2 $\frac{1}{2}$	White.....	Heavily spined....	Fairly productive.
Extra Early Long Green....						
*Tailby Hybrid						

* Did not germinate.

Siberian.—This is one of the earliest sorts in cultivation. The fruit is not large (averaging only about five inches) but is invariably produced several days ahead of any other variety yet tested and is withal very productive.

Early Frame.—Another extremely early variety, the fruit being slightly larger than the preceding one.

Cumberland.—This is a variety of comparatively recent introduction, of the white spine type, but is much more densely spined than that variety. A vigorous grower, very productive and combines the qualities essential both for pickling and slicing in a degree not attained by any other sort.

Pride of Canada.—Is a new white variety, larger than the White Wonder and more attractive in appearance.

Paris Prolific.—Continues to merit its reputation as one of the best pickling varieties tested here.

TOMATOES.

Sixty-one varieties of tomatoes were tested during 1902. Of these four failed to germinate, the germination of many of the others also showing poor vitality. It is to be regretted that with such a comprehensive list of varieties the season was not more favourable for this vegetable, as only one variety produced ripe fruit, viz., Red Currant, and the yield of green fruit was unusually below the average, three varieties not producing any fruit whatever. Representatives of all the varieties were grown both in rows three feet apart and also on a wire trellis, but there was practically no difference in the results by either method.

Earliest of All as in former years heads the list, giving the largest amount of green fruit. Dominion Day, a comparatively new variety, coming next. It would appear from our tests with this vegetable that in order to produce ripe fruit every season, it would be necessary to start the plants very early (say middle of March) in hotbed, and carry them along in pots until quite large plants, well hardened off are obtained, giving plenty of water when planted outside, so that no check results.

Following will be found result of the test arranged in the order of their yield.

All were sown in boxes in hotbed on April 1, transplanted on April 15 and planted out on June 11.

Variety.	Amount of Fruit from average Plant.	Appearance.	Germination.
	Lbs.		
Earliest of All	7 ¹ / ₆	Very wrinkled	Very good.
Dominion Day	5 ³ / ₄	Slightly " "	"
Early Conqueror	5 ⁵ / ₁₆	" " "	"
Democrat	4 ¹ / ₂	Smooth	Fair.
Livingston's Favorite	3 ¹ / ₄	Slightly wrinkled	Poor.
Thorburn's Earliest	3 ¹ / ₂	" " "	Fair.
Ponderosa	3 ¹ / ₄	" " "	Good.
Thorburn's Long Keeper	3	Smooth	Fair.
Honor Bright	2 ³ / ₄	"	Poor.
Earliana	2 ¹ / ₂	Wrinkled	Good.
Dwarf Scarlet Champion	2 ¹ / ₂	Smooth	Very good.
New Enormous	2 ¹ / ₄	"	"
Optimus	2 ¹ / ₄	"	Very poor.
Success	2 ¹ / ₄	Slightly wrinkled	Good.
Thorburn's Lemon Bush	2 ¹ / ₂	Smooth	Fair.
Imperial	2 ¹ / ₄	"	Good.
Aristocrat	2	"	Fair.
Freedom	2	"	Good
Lorillard	2	"	"
Creekside Glory	1 ³ / ₄	"	"
Crimson Cushion	1 ³ / ₄	Slightly wrinkled	Very poor.
Early Ruby	1 ¹ / ₄	" " "	"
Fordhook Fancy	1 ¹ / ₄	Smooth	"
Mikado	1 ¹ / ₂	"	Fair.
Waldorf	1 ³ / ₄	"	Good.
Acme	1 ¹ / ₂	"	Fair.
Combination	1 ¹ / ₂	"	Poor.
Livingston's Beauty	1 ¹ / ₂	"	Fair.
Pear Shaped	1 ¹ / ₂	Pear shaped	Good.
Red Cherry	1 ¹ / ₂	Smooth	Poor.
Atlantic Prize	1 ¹ / ₄	Wrinkled	"
Dwarf Golden Champion	1 ¹ / ₄	Smooth	Good.
Ignotum	1 ¹ / ₄	"	Very good.
Matchless	1 ¹ / ₄	"	Poor.
New Stone	1 ¹ / ₄	"	Very good.
Niagara	1 ¹ / ₄	Wrinkled	"
Pear Shaped Yellow	1 ¹ / ₄	Pear shaped	Poor.
Plentiful	1 ¹ / ₄	Smooth	Good.
Red Currant	1 ¹ / ₄	Small, round	Very good.
Thorburn's Terra Cotta	1 ¹ / ₄	Smooth	Fair.
Century	1	"	Poor.
Golden Queen	1	"	Fair.
Mayflower	1	Wrinkled	Very poor.
Trophy	1	Smooth	"
Livingston's Magnus	3 ³ / ₄	Wrinkled	Good.
New Yellow Peach	3 ¹ / ₄	Pear shaped	Fair.
Royal Red	2 ¹ / ₂	Smooth	Poor.
Thorburn's Rosalind	2 ¹ / ₂	"	Good.
Yellow Cherry	2 ¹ / ₂	"	Very good.
Yellow Plum	2 ¹ / ₂	"	"
Buckeye State	1 ¹ / ₄	"	Good.
Perfection	1 ¹ / ₄	"	Poor.
Upright Station Tree	Did not	produce fruit	
Thorburn's Novelty	"	germinate	
Thorburn's 1902	"	produce fruit	
Table Queen	"	germinate	
Sutton's Best of All	"	"	
Strawberry	"	"	
New Dwarf Champion	"	"	

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RHUBARB.

On page 437 of last year's report, a descriptive list was given of the nineteen varieties of rhubarb now growing on this farm, together with the weight of a single plant of each variety, pulled on a certain date. This was repeated during the past season, and the following list gives the weight from the plants taken on June 10, 1902:—

	Lbs.		Lbs.
Early Scarlet	10 $\frac{1}{2}$	Scarlet Nonpareil	16
Early Prince	15 $\frac{1}{2}$	General Taylor	4 $\frac{3}{4}$
Sangster's Prince of Wales	11 $\frac{1}{2}$	Royal Linnaeus	12 $\frac{1}{4}$
Tobolsk	16 $\frac{1}{2}$	Giant	12 $\frac{1}{4}$
Paragon	11 $\frac{3}{4}$	X. L. C. R. (new)	2
Prince Albert	13 $\frac{1}{2}$	Royal Albert	9 $\frac{3}{4}$
Magnum Bonum	16 $\frac{1}{4}$	Strawberry	10 $\frac{1}{4}$
Brabant's Colossal	12 $\frac{1}{4}$	Tottle's Improved	14
Early Crimson	16	Victoria	10 $\frac{1}{2}$

It will be seen by comparing this list with last year's report, that the weight is considerably less this season. This was no doubt occasioned by excess of water. A test is in progress to determine the amount of rhubarb that can profitably be pulled during the season without injuring the vigour of the plant. This will be reported on later.

POTATOES—TEST OF SETS.

This test was continued during 1902, in order to obtain information regarding the most suitable size of set, with the following results:—

Size of Set.	Weight of large.	Weight of small.	Total weight.	Productiveness.
	Lbs.	Ozs.	Lbs.	
Seed ends	10 $\frac{1}{2}$	5	10 $\frac{13}{16}$	Moderately regular.
One eye	7 $\frac{1}{16}$	7	7 $\frac{1}{16}$	"
Two eyes	11 $\frac{5}{16}$	12	12 $\frac{1}{4}$	Very regular.
Three eyes	11 $\frac{3}{4}$	11	12 $\frac{9}{16}$	Moderately regular.
Four eyes	12 $\frac{1}{4}$	10	13 $\frac{3}{8}$	Regular.
Whole	14 $\frac{1}{2}$	Lbs. 3 $\frac{1}{2}$	18	Very regular.

THE FLOWER GARDEN.

The flower garden this season unfortunately suffered severely from the excessive floods prevalent in this locality. A considerable portion of the lower lands was under water until well into the middle of July which occasioned very late planting, and the sour condition of the soil after the water had receded, rendered the successful growing of bedding plants impossible. A large number of perennials which were planted in this location were completely destroyed, which greatly spoiled the effect and altogether the garden was much below the average. Forty varieties of annuals were sown in the hotbed between April 1 and 14, and although the weather during April was very unpropitious for hotbed work, on account of coolness and lack of sunshine, the plants turned out well and were in good shape by planting out time.

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For the reasons given it was impossible to sow those annuals which are sown in the open, in the flower garden, hence one of the hillside plots was devoted to this purpose and forty-nine varieties were sown in this location on May 14, together with thirty varieties of named sweet pease. All these did exceptionally well and proved a source of interest to visitors in addition to providing plenty of cut flowers which would otherwise have been very scarce.

Following will be found short notes on some of the most noticeable of the annuals :

Lupins.—Six varieties sown outside on May 14. These flowers were exceptionally free in blooming, and of most delicate colours, besides having the merit of flowering for a long period.

Godetia.—Four varieties sown outside on May 14. This is one of the most beautiful of our annuals, their large flowers, of diversified colouring, showing to splendid advantage when massed. Should always be sown outside as they do not transplant readily.

Abronia Umbellata.—Sown outside on May 14 ; is a very showy annual trailer. Though not grown extensively it deserves more general recognition.

Annual Larkspur.—This well known annual was specially noticeable on account of its long period of blooming, continuing in flower until quite late in the season.

Asters, Salpiglossis, Stocks, Pecunias, Scabiosa, &c., were all very fine and made an excellent display throughout the season on those portions of the garden that had not been inundated.

PERENNIALS (HERBACEOUS).

The perennials which were moved to location on hillside in 1900 (see page 451 of last year's report) have become well established, and made a fine and continuous display of bloom throughout the past season. The following are worthy of special mention :

Spiraea filipendula.—The Herbaceous spireas are among the most beautiful of hardy perennials. This variety has very fern-like serrated leaves which lie close to the ground from the centre of which large flattened panicles of pure white flowers arise making a fine effect ; 18 inches high.

Spiraea filipendula fl. pl.—This is a double form of the above and is much superior, the flower spikes being much denser and of a purer white colour ; 18 inches high.

Pyrethrum uliginosum.—Produces large white daisy like flowers in profusion late in the autumn ; height 2 feet.

Geranium platypetalum.—A charming plant about 10 inches high which produces large flowers of a purplish red, a very desirable acquisition.

Hemerocallis variegata.—Similar in every respect to the Common Day Lily, but having beautifully variegated green and white leaves making it very striking. Height 3½ feet.

Thermopsis Caroliniana.—A showy perennial producing long dense spikes of pea shaped yellow flowers very striking ; height 2½ feet.

Coreopsis delphinifolia.—A pretty variety of coreopsis with foliage resembling the Delphinium and producing in abundance its yellow rayed flowers with dark centre ; height 1½ feet.

There are many other eminently satisfactory varieties included in this collection, which have not yet been touched upon in these reports, particulars of which will be given from year to year.

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BULBOUS PERENNIALS.

This class of flowers was very satisfactory during the past season, many varieties, which have hitherto succumbed to the winter, coming through in good condition and flowering well. The following brief notes will give an idea of the number of varieties tested together with special mention of some of the more meritorious ones.

Tulips.—In addition to the number of these bulbs which are planted for decorative purposes around the Superintendent's house and other portions of the farm, forty-seven named varieties were received from the Central Experimental Farm and planted on the perennial plot on hillside in the fall of 1901. All came through in fine condition, there being scarcely a break in any of the rows. They consisted chiefly of the following classes, viz.:—

Single Early.
Parrot (mixed).
Bybloemen.

Double Early.
Bizarre.
Late Double (mixed).

Of the Single Early.—Those specially worthy of notice were Rose Grisdelin, Couleur de Cardinal, Albion and Gold Finch.

Of the Double Early.—Couronne d'Or, Rose Aimable, Tournesol and Salvator Rosa.

Of Bizarre Varieties.—Trafalgar, Negress, Sword of Holland and Sultan Osman.

Of the Bybloemens—Henry IV.—Quadricolour, Grande Monarque and Bella Donna.

The Parrot varieties with their peculiarly twisted petals and variable colouring were much admired. The *Late Double* mixture also contained many fine varieties. Special mention should also be made of the following:—*Tulipa gesneriana*, *T. gesneriana spathulata*, *Bouton d'Or*, *Picotee*, *Golden Crown*, *T. viridiflora*, *T. Greigi*.

The latter are not included under any of the first mentioned classes, but are well worthy of cultivation.

Crocus.—Six varieties of *Crocus* were planted in the fall of 1901, and were given a slight winter covering of manure and for the first time since they have been tried here came through in the spring and flowered freely. The following varieties were represented:—Queen Victoria, Baron Brunos, Madame Mina, Sir Walter Scott, Prince Albert.

It is to be hoped that this hardiness will prove permanent as the fact of their flowering so early in the spring renders them specially valuable for Manitoba.

Snowdrops (Galanthus Elwesii).—A number of these bulbs were planted in the fall of 1901, and though not given any special covering, came through the winter in good condition and flowered well, the first occasion since testing here.

Scillas (Squills).—Three varieties of Squills were planted in the fall of 1901, and came through the winter and flowered well. The varieties were as follows:—*S. sibirica*, *S. sibirica alba*, *S. bifolia*.

Ornithogalum.—Two varieties of this bulb were planted in the fall of 1901, viz., *O. arabicum* and *O. umbellatum*, and both came through the winter well and flowered. This was the first test of this bulb at the Experimental Farm, and we consider it a valuable acquisition to our list of spring flowering bulbs.

Puschkinia.—Two varieties of this bulb were planted in the fall of 1901, for the first time on this farm, viz., *P. libanotica* and *P. scilloides*. The first mentioned did not survive the winter, but *P. scilloides* flowered freely, its pretty scilla-like flowers being much admired.

Chionodoxa.—Two varieties of this bulb, viz., *C. luciliae* and *C. gigantea*, were planted in the fall of 1901, and survived the winter, both flowering freely. As a spring flowering bulb it proved very acceptable.

Leucojum.—Five varieties of this bulb were planted in the fall of 1901, viz., *L. vernum*, *L. vernum carpathicum*, *L. autumnale*, *L. pulchellum* and *L. aestivum*. None of these survived the winter, and on examination all the bulbs were found to be decayed.

Fritillaria.—Eleven varieties of *Fritillaria* representing the following varieties were planted in the fall of 1901, viz., *F. Orange Brilliant*, *F. lutea*, *F. Persica*, *F. lutea maxima*, *F. Crown upon Crown*, *F. aurora*, *F. recurva*, *F. biflora*, *F. aurea*, *F. pluriflora* and *F. lanceolata*. Two bulbs survived the winter, one each of the following varieties *F. Orange Brilliant* and *F. Crown upon Crown*, but did not produce flowers. On examination the remainder of the bulbs were found in a decayed condition.

Colchicum autumnale.—Several bulbs of this pretty autumn flower were planted in the fall of 1901. They gave no indication of life until we had been visited with several severe frosts and a light fall of snow when they appeared in full flower above the snow. In general appearance they resemble the *Crocus* and are to be desired on account of their very late period of blooming.

Iris.—Ten varieties of *Iris Hispanica* were received from the Central Experimental Farm and planted in the fall of 1901, together with a few bulbs of each of the following: *Iris pavonia*, *Iris persica*, and *Iris alata*. None of these survived the winter, and on examination were found to be in a decayed condition.

The following varieties of Lilies were received from the Central Experimental Farm in the fall of 1901, arriving here too late for planting as the soil was solidly frozen:—*Lilium davuricum Gretchen*, *L. Hansonii*, *L. davuricum atrosanguineum*, *L. Tottenhami*, *L. davuricum incomparabile*, *L. Sensation*, *L. davuricum Britannicum*, *L. elegans aureum*, *L. elegans Van Houttei*, *L. davuricum grandiflorum* *L. incomparabilis*.

To bring them through the winter the following plan was adopted. The bulbs were placed in small cotton bags, with a liberal mixture of sand and tied securely. A small trench was made into which the bags were placed, and given a light covering of sand, the whole being covered with three feet of fresh manure. On opening them up the following spring all were found to be in splendid condition and were planted in permanent location on April 10, 1902. All flowered exceptionally well and maintained a succession of bloom for two months. This is the first time they have been tested here and they will form a valuable addition to our list of hardy lilies.

Hyacinthus candicans.—Six bulbs of this beautiful flower were received from the Central Experimental Farm and planted on May 5, in perennial plot on hillside. They made vigorous growth, and their long spikes of white flowers were much admired at our annual exhibition here, numerous inquiries being made regarding them.

DAHLIAS.

The following varieties of Dahlias were received from the Central Experimental Farm in April, 1902, and planted outside on May 3, three feet apart. These are all new varieties for this farm, and consist chiefly of the Cactus and Pompon classes:—

Kingfisher	Prince of Orange
Prince Imperial	Matchless
Ernest Glasse	Blanche Keith*
Austin Cannell	Stella
Mrs. Leopold Seymour	Miss Finch
Mrs. H. Turner	Starfish*
Grand Duke Alexis	Harry Stredwick*
American Flag	Prof. Baldwin*
Gilt Edge	Queen of Primroses
Lady H. Grosvenor	Standard Bearer
Louis Hariot*	Kynerith*
Capstan*	

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Those marked * failed to start, but the balance made strong plants and flowered well, and for an unusual length of time. The varieties specially noted were:—

Grand Duke Alexis	Stella
Gilt Edge	Matchless
American Flag	Prince of Orange
Queen of Primroses	

All were lifted before frost and stored in root cellar in boxes of sand.

DISTRIBUTION OF GRAIN, POTATOES, ETC.

The usual distribution was made of potatoes, maple seed, rhubarb seed, flower seeds and grain. The following quantities were sent out to applicants:—

Grain of all kinds in 3-pound bags.....	401
Seedling trees and shrubs, packages.....	485
Potatoes in 3-pound bags.....	237
Maple seed in $\frac{1}{2}$ -pound bags.....	216
Rhubarb seed, packages.....	107
Flower seed, packages.....	206
Brome grass seed, 1-pound packages.....	74

Box Elder or Manitoba Maple Seeds.

The following reports have been received from parties to whom Manitoba Maple Seeds were sent in 1-pound packages during the spring of 1901:—

No. of applicants supplied.....	471	
No. of reports received.....	91	
	Successes.	Failures.
Seeds sown on summer fallow.....	50	7
" spring ploughing.....	11	1
" fall ploughing.....	6	1
" breaking.....	12	1
" garden (dug with spade).....	2	0
Maximum number of trees grown from one packet, 2,500.		

Reports of Distributions of Collections of Trees, Spring 1901.

Only thirteen per cent of parties supplied with trees reported on them. Eighty-eight per cent of these reported having received the packages in good condition.

Number of applicants supplied.....	423
" reports received.....	32
" report success.....	27
" " partial success.....	3
" " failure.....	2

SAMPLES FOR EXHIBITION PURPOSES.

Several cases of samples were sent to the exhibitions at Cork, Ireland, and Wolverhampton, England, where they were exhibited along with samples from the other experimental farms.

A small exhibit was also sent with the North-west Press Association car, which travelled through the Western States.

Fourteen cases of samples have been prepared for the Japanese Exhibition to be held in Osaka next year.

The usual exhibits were made at the Brandon Agricultural and Horticultural Shows, and a small display was made at the Western Horticultural Exhibition at Winnipeg.

VISITORS.

Although the conditions were not as favourable as usual the number of visitors to the experimental farm during the year approximated six thousand. Amongst these were the Methodist Board of Missions, the Boer delegates sent to Canada by the Imperial Government, and a very large number of delegates from the United States.

There were two excursions to the farm during the summer, one from the C. P. R. Glenboro branch and one from the C. P. R. Pembina branch. Three other excursions were arranged for, but had to be abandoned owing to the bridges over the Assiniboine river being impassable.

FARMERS' MEETINGS.

During the year farmers' meetings were attended and addresses given at the following places :—

	1902.		1902.
Rapid City.....	Dec. 21	Glenboro.....	Mar. 11
Brandon.....	Feb. 1	Cypress River.....	Mar. 11
Bradwardine.....	Feb. 12	Holland.....	Mar. 12
Winnipeg.....	Feb. 20, 21	Treherne.....	Mar. 13
Wawanessa.....	Mar. 10	Carman.....	Mar. 14

METEOROLOGICAL TABLES.

	Highest tempera- ture.	Lowest tempera- ture.	Total rainfall.	Total snowfall.	Total amount of sunshine.
—					
1901.	Day. Deg.	Day. Deg.	In.	In.	Hr.
December.....	28 39	13 —33	.....	7	68·6
1902.					
January.....	6 40	27 —37·3	.....	1	134·1
February.....	21 41·9	4 —23	.....	8	97·2
March.....	9 42	17 —18	·65	21	106
April.....	9 58	1 —15	·43	2	189·3
May.....	30 85	9 28	3·37	.....	198·1
June.....	8 77	21 35·5	9·97	.....	207·2
July.....	23 87	27 42	1·84	.....	316·6
August.....	27 89	30 35	·67	.....	278·1
September.....	7 82	17 20	·61	.....	184·6
October.....	5 74	9 15	·38	.....	132·2
November.....	3 56	30 —15	.....	12	76·1
			17·92	51	1988·1

CORRESPONDENCE.

This year 4,464 letters were received and 2,969 despatched, irrespective of 2,755 circulars sent out.

I have the honour to be, sir,
Your obedient servant,
S. A. BEDFORD,
Superintendent.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES.

REPORT OF ANGUS MACKAY, SUPERINTENDENT.

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.,
November 30, 1902.

DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa, Ont.

SIR,—I have the honour to submit herewith the fifteenth annual report of the operations on the Experimental Farm for the North-west Territories, at Indian Head, Assiniboia, during the year 1902.

The past season, like 1901, has been a most successful one throughout the Territories, and although in some districts the yield of the present year was surpassed by that of 1901, the ease and dispatch, rendered possible by the magnificent weather, with which the crop was handled, has compensated in a large degree for any decrease that may have occurred in the yield. The weather for harvesting, threshing, teaming and all out-door work could not have been excelled.

The winter of 1901-2 was unusually mild and fine, and the snow-fall was below the average. Several cold dips occurred but they were of short duration, and no bad storms were experienced during the winter. Spring however was backward, and although in some districts grain was sown about the middle of April, on account of snow and rain, and the consequent wet condition of the soil, very little was done until about May 15. Heavy rains fell during May and with the already soaked condition of the land, seeding was a difficult matter and all growth was extremely backward. June was wet and the temperature was below the average; but the crops made rapid progress. Rains ceased early in July and from that time to the present no rain of any consequence has fallen.

From the time harvest commenced, about August 20, practically no time was lost through rain until all grain was cut, stacked and threshed. Frost overtook some of the late sown grain before it came to maturity, but in proportion to the bountiful crop of good wheat the loss from this cause is very small. The cold, backward spring caused late seeding and consequent late ripening.

Rust, which has hitherto been almost unheard of in the territories, did a small amount of damage this year.

The year throughout has been most favourable for stock and excellent reports are being received from the ranching districts.

EXPERIMENTAL FARM CROPS.

The crops on the Experimental Farm, while satisfactory in the majority of cases, averaged much below those of 1901. A large decrease will be noticed in the yields of potatoes and field-roots, with the exception of carrots. The long drouth following a wet spring caused the ground to bake, and small roots were the result.

The seed on a number of plots of oats and barley rotted and the plots had to be resown, resulting in somewhat later and smaller crops than would otherwise have been the case.

Hay gave good returns and was well secured. The fruit crop was abundant; currants and raspberries being particularly good. Plums, although a heavy crop, were

caught by frost before they came to maturity, and were destroyed. The crop of crab-apples, (Pyrus), was very satisfactory. Native fruit was a complete failure.

EXPERIMENTS WITH SPRING WHEAT.

Seventy-one varieties were tested on 1-20 or 1-40 acre plots ; eight of the same varieties on plots ranging from 1 acre to 9½ acres. Red Fife was used in the test of fertilizers ; rotation test ; test of selected, well cleaned and small seed, and in the test of blue-stone as a preventive of smut.

TEST OF VARIETIES IN UNIFORM PLOTS.

Seventy-one varieties were sown on April 19, on 1-20 or 1-40 acre plots of well prepared fallow. The soil was clay loam. The seed was sown by hoe-drill, at the rate of 1½ bushels per acre.

SPRING WHEAT—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.		No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
									Bush.	Lbs.	
				In.		In.		Lbs.			Lbs.
Goose.....	Aug. 26..	129	52	Strong..	23½	Bearded..	4,900	51	40	65¼	
Rio Grande.....	" 29..	132	52	" ..	4	" ..	4,400	49	..	63	
Preston.....	" 25..	128	50	" ..	3½	" ..	4,860	48	40	63½	
Red Fern.....	" 29..	132	51	" ..	3½	" ..	5,280	48	..	63½	
Roumanian .. .	" 28..	131	51	" ..	2½	" ..	4,440	47	..	66	
Colorado.....	" 29..	132	42	" ..	2½	" ..	4,400	45	40	65	
Plumper.....	" 25..	128	39	Weak ..	3	" ..	4,520	44	40	65½	
Percy.....	" 26..	129	53	Strong..	3	Bald	3,800	44	..	62	
Dion's.....	" 28..	131	48	" ..	4	Bearded..	2,760	44	..	64½	
Herisson Bearded .. .	" 29..	132	42	Weak ..	2	" ..	3,800	44	..	66	
Stanley.....	" 26..	129	49	Strong..	3	Bald	3,320	42	40	62½	
Pringle's Champlain.....	" 28..	131	49	" ..	3½	Bearded..	2,900	42	20	64	
Weldon.....	" 26..	129	50	" ..	2½	Bald	3,240	42	..	63	
Admiral.....	" 25..	128	46	" ..	3	Bearded..	4,100	41	20	63¾	
Vernon.....	" 28..	131	51	" ..	3	" ..	3,140	41	..	63	
Huron.....	" 22..	125	44	" ..	3	Bald	2,780	40	..	63	
Hungarian.....	" 28..	131	52	Weak ..	3	Bearded..	2,120	40	..	64½	
Dufferin.....	" 28..	131	48	Strong..	2½	" ..	2,100	39	20	63½	
Wellman's Fife.....	" 27..	130	46	" ..	3½	Bald ..	3,760	39	20	62	
Red Swedish.....	" 28..	131	52	Weak ..	2½	Bearded..	4,380	39	..	62¼	
Ladoga.....	" 25..	128	48	Strong..	2½	" ..	4,160	38	20	62	
Progress.....	" 25..	128	44	" ..	3	Bald	2,880	38	20	63	
Byron.....	" 26..	129	45	Weak ..	3½	Bearded..	3,140	37	40	65	
Minnesota No. 149.....	" 30..	133	39	Strong..	3	Bald	3,560	37	20	63	
Mason.....	" 26..	129	42	Weak ..	2	" ..	5,160	37	..	64¾	
Speltz.....	" 28..	131	42	" ..	2	" ..	3,180	36	20	..	
Alpha.....	" 26..	129	47	Strong..	3	Bearded..	3,860	36	..	63½	
Minnesota No. 163.....	" 30..	133	40	" ..	3	Bald	3,260	35	40	64	
Monarch.	" 28..	131	49	" ..	3	" ..	2,580	35	40	62½	
Australian No. 27.....	" 27..	130	45	" ..	3½	" ..	4,260	35	..	61	
Beaudry.....	" 28..	131	39	" ..	3	Bearded..	2,520	35	..	65	
Dawn.....	" 24..	127	42	Weak ..	2½	Bald ..	3,660	35	..	64	
Fraser.....	" 25..	128	37	Strong..	2½	Bearded..	2,680	35	..	64	
Crown.....	" 27..	130	40	" ..	3	Bald	2,300	34	40	63	
White Fife.....	" 27..	130	44	" ..	3½	" ..	5,120	34	40	62½	
Cartier.....	" 26..	129	45	Weak ..	3	Bearded..	3,440	34	20	65½	
Early Riga.....	" 20..	123	37	" ..	2	Bald	2,080	34	20	64	
Norval.....	" 26..	129	44	" ..	2½	Bearded..	3,160	34	..	64	
White Connell.....	" 28..	131	46	Strong..	3½	Bald	2,840	34	..	63	
Blair.....	" 26..	129	36	Weak ..	2	" ..	4,100	33	40	63½	
Minnesota No. 169.....	" 30..	133	46	Strong..	3½	" ..	3,060	33	..	59¼	

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SPRING WHEAT—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
								Bush.	Lbs.	
Rideau	Aug. 27..	130	38	Weak ..	2 $\frac{1}{2}$	Bald.....	3,620	33	..	63
White Russian	" 27..	139	44	Strong..	3 $\frac{1}{2}$	"	3,280	32	40	59
Minnesota No. 181.....	" 30..	130	44	" ..	3	"	3,080	32	40	61 $\frac{1}{2}$
Australian No. 19.....	" 27..	130	38	Weak ..	3	"	2,540	32	20	63 $\frac{1}{2}$
" No. 25.....	" 27..	130	42	Strong..	3	"	3,340	32	20	62
" No. 13.....	" 27..	130	44	Weak ..	2 $\frac{3}{4}$	"	4,140	31	20	62
" No. 10.....	" 27..	130	39	" ..	3	"	3,360	31	20	61 $\frac{1}{2}$
Blenheim	" 27..	130	40	Strong..	3 $\frac{1}{4}$	Bearded..	2,460	31	..	63
Bishop.....	" 26..	129	41	Weak ..	2 $\frac{1}{4}$	Bald	2,960	30	40	64
Cassel	" 27..	130	43	Strong..	3	"	3,200	30	40	62 $\frac{1}{2}$
Ebert.....	" 25..	128	40	" ..	2 $\frac{3}{4}$	"	2,160	30	40	64
Advance.....	" 28..	131	48	" ..	3	Bearded..	3,560	30	40	63
Beauty	" 27..	130	41	" ..	3	Bald	3,220	30	40	60
Clyde.....	" 26..	129	48	" ..	3 $\frac{1}{4}$	"	3,020	29	40	63 $\frac{1}{2}$
Red Fife.....	" 27..	130	45	" ..	3	"	3,200	29	20	62 $\frac{1}{4}$
Australian No. 23	" 27..	130	38	Weak ..	3 $\frac{1}{4}$	"	2,260	29	..	62 $\frac{1}{2}$
Captor	" 27..	130	39	" ..	2 $\frac{3}{4}$	"	3,720	29	..	63
Countess.....	" 27..	130	48	Strong..	2 $\frac{3}{4}$	"	2,360	29	..	63
Essex.....	" 29..	132	41	" ..	2 $\frac{3}{4}$	"	3,320	29	..	63
Chester	" 27..	130	36	Weak ..	3	"	2,680	28	40	65
White Chaff, Campbell's	" 27..	130	44	Strong..	3	"	3,520	28	20	64
Robin's Rust-proof.....	" 28..	131	42	Weak ..	3	"	3,960	28	20	62
Australian No. 9.....	" 27..	130	44	Strong..	3	"	3,500	28	..	62 $\frac{1}{2}$
Laurel	" 29..	132	41	Weak ..	3 $\frac{1}{4}$	"	3,160	27	40	58
Hastings.....	" 26..	129	36	" ..	2 $\frac{1}{4}$	"	2,860	27	20	65
Harold. ..	" 25..	128	40	Strong..	2 $\frac{1}{2}$	Bearded..	2,440	27	20	62
Angus	" 27..	130	48	" ..	3	Bald	2,540	27	20	63 $\frac{1}{2}$
Japanese.	" 25..	128	39	Weak ..	2 $\frac{1}{2}$	Bearded..	3,180	26	20	62 $\frac{1}{2}$
Crawford	" 25..	128	40	Strong..	3	Bald	2,610	26	..	63 $\frac{1}{2}$
Benton	" 27..	130	36	Weak ..	3	"	2,460	25	40	65

WHEAT.

TEST OF VARIETIES IN FIELD LOTS.

Four varieties of wheat were sown on new land broken and backset in 1901; five varieties on fallow and three varieties on root land of 1901.

The new land was broken two inches deep, back-set, two inches deeper and well cut up by disc-harrow.

The fallow was ploughed seven inches deep during the latter part of May and cultivated during the summer as often as the weeds required attention.

The root land, which had produced a crop of potatoes, mangels, turnips, carrots, sugar beets and corn in 1901 was well ploughed and harrowed after the root crop had been taken up, and in the fall of 1900 a heavy coating of manure had been applied to the field.

Fair crops were secured from the fallow and back setting, but on the root land the crop of straw was abnormal and rust striking the field early in the season, made a serious reduction in the yield and quality.

SPRING WHEAT—FIELD LOTS.

Variety.	Cultivation.	Size of Plot.	Date of Sowing.	Date of Ripening.	No. of days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.
		Acres.				In.		In.		Bu. lbs
Huron.....	Fallow	$\frac{3}{4}$	May 6	Aug. 26	112	50	Strong..	3	Bald ...	39 20
Red Fife.	Back-setting, native sod	$9\frac{1}{2}$	April 14	" 25	133	48	" ..	$3\frac{1}{4}$	"	38 30
Red Fern..	Fallow	3	" 27	" 29	124	52	" ..	$3\frac{1}{2}$	Bearded	36
Wellman's Fife.	"	4	" 30	" 30	122	48	" ..	$3\frac{3}{4}$	Bald ...	36
Stanley	"	1	" 30	" 26	118	50	" ..	$3\frac{1}{2}$	"	34
Stanley	Back-setting, native sod	4	" 17	" 20	125	45	" ..	$3\frac{3}{4}$	"	34
Red Fife.	Fallow	$4\frac{1}{2}$	" 27	" 30	125	53	" ..	3	"	32 40
Percy	Back-setting, native sod	4	" 16	" 22	128	48	" ..	$3\frac{1}{2}$	"	32 30
*Red Fife	Root land, 1901.....	$1\frac{3}{4}$	" 30	" 29	121	42	" ..	3	"	29
Preston.....	Back-setting, native sod	$2\frac{1}{2}$	" 17	" 22	127	44	" ..	$3\frac{3}{4}$	Bearded	29
*Preston.....	Root land, 1901.....	$3\frac{1}{4}$	" 30	" 22	114	54	" ..	$3\frac{1}{4}$	" ..	25 30
*White Russian.	"	2	" 30	" 29	121	48	" ..	$3\frac{1}{2}$	Bald ...	23 45

* Rusted badly.

Total area occupied, $40\frac{1}{4}$ acres.

Total yield of grain, 1,346 bushels, an average of 33 bush. 25 lbs. per acre.

SPRING WHEAT—TEST OF BLUE STONE AS A PREVENTIVE OF SMUT.

Sown on May 12, on 1-40th acre plots of fallow, by hoe-drill, at the rate of $1\frac{1}{2}$ bushels per acre.

Seed.	Condition.	Treatment.	On 25 square feet.	
			Good heads.	Smutty heads.
Red Fife ...	Good seed..	Treated 1 lb. of blue stone to 10 bush. seed. Dipped 5 minutes	Bush. 900	None.
" ...	" ..	Untreated.....	863	12

SPRING WHEAT—COMPARATIVE TEST OF SOWING SELECTED, WELL-CLEANED AND SMALL SEED.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.
			In.		In.	Lbs.	Bush. Lbs.	Lbs.
Red Fife, selected seed.....	Aug. 27 ..	136	44	Strong....	3	3,440	37 20	$63\frac{1}{2}$
" well-cleaned seed.....	" 27..	130	45	"	3	3,360	32 20	63
" small seed	" 27..	130	45	"	3	3,120	29 20	$63\frac{1}{2}$

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In the above test the selected seed used was hand picked when ripe and before being cut in 1901, and thoroughly cleaned by mill; the well-cleaned seed was our best Red Fife, run twice through the fanning mill and was a large, plump sample. The small seed was what was taken out of the well-cleaned seed.

The seed was sown on 1-20th acre plots of fallowed land, by hoe-drill, at the rate of $1\frac{1}{2}$ bushels per acre on April 19.

SPRING WHEAT.

TEST OF FERTILIZERS.

Six plots of 1-40th acre each were sown May 12. Five of these were treated with artificial manures and the sixth used as a check-plot. They were sown with Red Fife Wheat, by hoe-drill, at the rate of $1\frac{1}{2}$ bushels per acre.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			In.		In.	Lbs.	Bush.	Lbs.	Lbs.
Plot No. 1— Nitrate of soda, 100 lbs. per acre (half sown when grain was 2 inches high, balance when 6 inches high).....	Aug. 28	108	45	Strong..	3	3,160	28	..	61
Plot No. 2— Nitrate of soda, 200 lbs. per acre (half sown when grain was 2 inches high, balance when 6 inches high).....	" 28	108	47	" ..	3	3,880	30	40	62
Plot No. 3— Superphosphate, No. 1, 400 lbs. per acre (sown before grain and harrowed).....	" 27	107	44	" ..	3	3,200	26	40	61½
Plot No. 4— Check-plot. Unfertilized.....	" 28	108	44	" ..	3	3,760	29	20	61½
Plot No. 5— Muriate of potash, 200 lbs. per acre (sown before grain and harrowed).....	" 27	107	44	" ..	3	3,200	30	40	63
Plot No. 6— Superphosphate No. 1, 200 lbs. per acre; muriate of potash, 100 lbs. per acre; nitrate of soda, 100 lbs. per acre (half sown before grain and harrowed, and the balance when the grain was 2 inches high).....	" 28	108	44	" ..	3	3,160	32	..	62½

SPELTZ.

Sown on fallow by hoe-drill, at the rate of 2 bushels per acre.

One-fortieth acre.—Sown April 19. Ripe August 28. Days to mature, 131. Length of straw, 42 inches. Straw, weak. Length of head, 2 inches. Bearded. Weight of straw, 3,180 lbs. per acre. Yield, 36·20 bushels per acre.

One acre.—Sown May 12. Ripe August 28. Days to mature, 108. Weight of straw, 3,000 lbs. per acre. Yield, 34 bushels 10 lbs. per acre.

FALL WHEAT.

The seed sown on August 7 by hoe-drill as deep as the drill would work, was obtained in the Pincher Creek and Mountain View districts of Alberta, and was no doubt as hardy as any that could be had.

When the first killing frost came in the fall, the wheat had attained a height of 8 inches, and formed a thick mat entirely covering the ground.

The crop, however, was a complete failure, not a single plant being alive in May.

In the Pincher Creek district and the Mormon settlements of Southern Alberta, fall wheat proved very successful and some large yields were secured; while from the more northerly portions of that territory, reports of about an equal number of successes and failures have been received.

This fall the test is being continued by the seeding of Choice Club and Blue-stem on fallow on October 7.

EXPERIMENTS WITH OATS.

Sixty-five varieties of oats were tested on plots of 1-20th acre each; twelve of the same varieties on plots of $\frac{3}{4}$ to $9\frac{1}{4}$ acres. Banner oats was used in the rotation test. With the exception of Banner sown on stubble, all oats were sown on fallowed land.

The fallow was ploughed early in June and cultivated or harrowed, 2 to 3 inches deep, several times during the season. The stubble land was ploughed 4 inches deep immediately before seeding.

On account of the cold, wet spring, the seed where sown too deep, failed to germinate. In low places a great deal of the seed rotted and in a few cases the land had to be resown. The uniform trial plots of 1-20th acre each were sown May 12 on clay loam summer-fallowed. Sown by hoe-drill at the rate of 2 bushels per acre.

OATS—FIELD LOTS.

Name of Variety.	Cultivation of Soil.	Size of Plot.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Length of Head.	Kind of Head.	Yield per Acre.	Weight per Bushel.
		Acres.				In.	In.		Bush. Lbs.	
Goldfinder.....	Fallow.....	4	May 13	Sept. 2	112	46	10	Sided.....	89 17	37
Banner.....	".....	$9\frac{1}{4}$	" 6	Aug. 21	107	56	$10\frac{1}{2}$	Branching	87 ..	$40\frac{1}{2}$
Wide-awake.....	".....	5	" 7	" 23	108	49	9	" ..	87 ..	44
Tartar King.....	".....	6	" 7	" 20	105	56	$10\frac{1}{2}$	Hlf.brchg.	85 ..	$43\frac{1}{2}$
Waverley.....	".....	6	" 8	" 25	109	51	$10\frac{1}{2}$	Branching	82 ..	$39\frac{1}{2}$
Black Beauty.....	".....	$\frac{3}{4}$	" 12	Sept. 5	116	50	9	" ..	81 12	$37\frac{1}{2}$
Abundance..	".....	5	" 6	Aug. 23	109	49	$9\frac{1}{4}$	" ..	80 ..	42
Improved Ligowo ..	".....	5	" 7	" 25	110	49	10	" ..	77 20	$44\frac{1}{2}$
Early Archangel.....	".....	1	" 12	Sept. 2	113	53	11	" ..	74 4	41
Lincoln.....	".....	1	" 12	" 2	113	53	9	" ..	65 30	39
Thousand dollar.....	".....	1	" 12	" 2	113	52	10	" ..	64 8	$41\frac{1}{2}$
Bavarian ..	".....	1	" 12	" 2	113	51	12	" ..	52 32	39
Banner.....	Stubble-land	8	" 14	Aug. 26	104	35	9	" ..	46 17	37

Total area occupied, 53 acres. Total yield of grain, 4,077 bushels 28 lbs., an average of 76 bushels 32 lbs. per acre.

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OATS—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.
			In.		In.		Lbs.	Bush. Lbs.	Lbs.
Danish Island.....	Aug. 25	105	44	Strong....	13	Sided.....	3,060	89 14	42 $\frac{1}{2}$
Banner.....	" 27	107	46	"	11	Branching..	3,660	88 8	41 $\frac{1}{2}$
Tartar King.....	" 26	106	49	"	11	Sided.	3,320	86 16	42 $\frac{1}{2}$
Golden Tartarian.....	Sept. 1	112	48	"	13	"	3,560	83 18	38
Golden Giant.....	" 1	112	48	"	12	"	3,580	82 32	38
Improved American	Aug. 26	106	50	"	11	Branching..	3,180	82 20	41
Holstein Prolific.....	" 26	106	50	"	12	"	3,800	82 2	38 $\frac{1}{2}$
Wide Awake.....	" 25	105	50	"	12	"	3,460	80 20	44
Abundance.....	" 25	105	44	"	10	"	3,020	80 20	37
Columbus.....	" 28	108	48	"	10	"	3,640	80 20	39
Thousand Dollar	" 26	106	50	"	11	"	3,480	78 24	43 $\frac{1}{2}$
Oxford.....	" 26	106	52	"	12	"	3,100	78 8	38
Siberian.....	Sept. 1	112	50	"	13	Sided.....	3,720	77 2	35
New Zealand.....	" 1	112	45	"	13	"	3,060	75 10	40
Oderbruch.....	Aug. 26	106	50	"	9	"	3,380	75 10	43 $\frac{1}{2}$
Golden Beauty.....	" 25	105	44	"	11	Branching..	3,600	75 10	41
Waverley	" 30	110	50	"	10	"	3,840	75 10	41
Irish Victor.....	Sept. 1	112	48	"	11	"	3,300	74 24	35
King.....	Aug. 28	108	49	"	12	"	3,780	74 24	41 $\frac{1}{2}$
Salines.....	Sept. 1	112	48	"	13	"	3,580	74 24	36
Bavarian.....	Aug. 25	105	41	"	10	"	2,900	74 24	41
Goldfinder	" 30	110	45	"	10	Sided.....	3,020	74 4	40 $\frac{1}{2}$
Improved Ligowo.....	" 26	106	49	"	12	Branching..	3,500	72 24	40
Salzer's Big Four.....	" 30	110	42	"	11	"	3,660	72 2	38
Miller.....	" 28	108	42	"	12	"	3,560	71 26	38
Wallis.....	" 30	110	46	"	12	"	3,320	71 26	39
Early Archangel.. ..	" 24	104	40	"	12	"	3,200	71 26	40 $\frac{1}{2}$
Buckbee's Illinois.....	" 24	104	50	"	10	Sided.	3,340	68 28	42
White Russian.....	" 25	105	51	"	12	Branching..	3,900	68 28	44 $\frac{1}{2}$
Twentieth Century.....	Sept. 1	112	44	"	11	"	3,780	68 14	40
American Beauty.....	Aug. 26	106	48	"	12	"	3,200	68 8	39
Milford	" 30	110	46	"	12	Sided.....	3,540	67 22	40 $\frac{1}{2}$
Joanette.....	Sept. 1	112	38	"	10	Branching..	3,980	66 16	38 $\frac{1}{2}$
Lincoln	Aug. 25	105	50	"	11	"	3,760	66 16	41 $\frac{1}{2}$
Rosedale.....	Sept. 1	112	47	"	12	Sided.....	3,740	66 16	39
Abyssinia	Aug. 26	106	48	"	12	Branching..	3,500	66 16	41
Black Beauty.....	" 28	108	45	"	11	"	3,100	66 16	37 $\frac{1}{2}$
Newmarket	" 25	105	41	"	12	"	3,960	65 30	44 $\frac{1}{2}$
Mennonite.....	" 26	106	48	"	10	"	3,860	65 10	39
Early Golden Prolific....	" 26	106	50	"	9	"	3,220	65 10	38 $\frac{1}{2}$
Kendal.....	Sept. 1	112	44	"	12	"	3,900	64 24	39
Hazlett's Seizure	Aug. 24	104	40	"	12	"	3,210	64 4	46
Prolific Black Tartarian.....	Sept. 3	114	47	"	11	Sided.....	3,820	63 18	36 $\frac{1}{2}$
California Prolific Black.....	" 5	116	47	"	13	"	3,620	63 18	36 $\frac{1}{2}$
Sensation	Aug. 29	109	50	"	11	Branching..	3,060	63 18	39
Olive.....	Sept. 2	113	48	"	11	Sided.....	3,840	62 32	39
Pense.....	" 6	117	44	"	10	"	3,100	62 32	34 $\frac{1}{2}$
White Schonen.....	Aug. 24	104	42	"	12	Branching..	3,060	62 12	42
Master.....	" 30	110	48	"	13	Sided.....	3,340	61 26	37 $\frac{1}{2}$
Brandon.....	" 28	108	50	"	11	Branching..	4,200	60 ..	37 $\frac{1}{2}$
Early Blossom.....	Sept. 1	112	48	"	11	Sided.....	3,760	59 18	35
American Triumph.....	Aug. 30	110	48	"	10	Branching..	3,730	57 22	37 $\frac{1}{2}$
Black Mesdag.....	Sept. 1	112	38	"	10	"	3,840	57 22	39 $\frac{1}{2}$
Flying Scotchman.....	Aug. 24	104	38	"	12	"	3,760	57 2	41 $\frac{1}{2}$
Scotch Potato.....	" 30	110	45	"	12	"	3,520	56 16	38
Cromwell.....	Sept. 1	112	44	"	13	"	4,340	56 16	40 $\frac{1}{4}$
Early Gothland.....	" 1	112	48	"	11	Sided.....	3,680	56 16	38
White Giant.....	Aug. 24	104	42	"	12	Branching..	4,680	55 10	34 $\frac{1}{2}$
Russell	" 26	106	51	"	13	"	3,240	54 24	40 $\frac{1}{2}$
Early Maine.....	" 26	106	48	"	9	"	4,100	54 4	34
Longhoughton.....	" 30	110	48	"	12	"	3,400	54 4	40
Bonanza.....	" 24	104	38	"	11	"	3,800	49 14	46 $\frac{1}{2}$
Holland.....	" 28	108	50	"	12	Sided.....	3,560	49 14	36 $\frac{1}{2}$
Pioneer	Sept. 2	113	45	"	10	Branching..	3,280	46 20	40 $\frac{1}{2}$
Cream Egyptian.....	Aug. 25	105	39	"	11	"	3,360	42 12	44 $\frac{1}{2}$

OATS.—COMPARATIVE TEST OF SELECTED, WELL CLEANED AND SMALL OATS FOR SEED.

Name of Variety.	Date of Ripening.		Number of Days Maturing.	Length of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.	
				Inches.	Inches.	Lbs.	Bush.	Lbs.
Banner, selected seed.	Aug.	26	106	50	11	3,720	86	16
" well cleaned.	"	26	106	50	11	3,800	80	20
" small seed	"	26	106	46	11	3,840	72	2

The seed sown in the above test was procured in the same manner as that used in a similar test with wheat.

Sown May 12 on 1-20th acre plots of fallow, by hoe-drill, at the rate of 2 bushels per acre.

EXPERIMENTS WITH BARLEY.

Thirty varieties of six-rowed, and twenty-two varieties of two-rowed barley were sown on plots of 1-20th acre each, and six of the same varieties on plots of 1/3 to 5 acres each. The land was fallowed and was prepared in the same manner as that for wheat and oats.

As with the oats, the barley seed wherever sown deep, rotted in low places, and a number of the plots had to be resown. The yields, however, were very satisfactory. The uniform trial plots were all sown May 17 on clay loam by hoe-drill, at the rate of 2 bushels per acre.

BARLEY—SIX-ROWED—TEST OF VARIETIES.

Name of Variety.	Date of Ripening		Number of days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
				In.		In.	Lbs.	Bush.	Lbs.	Lbs.
Claude.....	Aug.	26.....	101	38	Strong..	3	2,920	66	32	52
Odessa	"	24.....	99	40	"	2 3/4	3,180	65	..	53 1/2
Empire.....	"	26.....	101	39	"	2 3/4	3,440	62	44	52 1/2
Blue Long Head.....	"	26.....	101	38	"	3	3,020	62	24	53
Summit	"	28.....	103	39	"	3	3,400	60	40	50
Royal	"	24.....	99	38	"	3 1/4	2,040	58	36	53
Mansfield.....	"	24.....	99	40	"	3	3,260	57	44	50
Nugent.....	Sept.	4.....	110	40	Weak ..	3 1/2	3,500	53	36	52 1/2
Surprise	Aug.	26.....	101	38	Strong..	3	2,340	53	36	52 1/2
Garfield.....	"	24.....	99	40	"	3	3,160	52	4	52 1/2
Mersury.....	"	24.....	99	45	"	3	3,020	51	12	52
Common	"	26.....	101	37	"	3	2,480	50	..	53
Brome	"	26.....	101	38	"	3	2,100	49	28	50
Oderbruch.	"	24.....	99	37	Weak ..	3	2,460	49	8	51
Stella	"	26.....	101	36	Strong..	3 1/4	2,280	48	36	54
Trooper	"	24.....	99	38	"	3	2,120	48	16	53
Yale.....	"	24.....	99	40	"	2 3/4	3,600	48	16	52
Hulless, Black.....	Sept.	1.....	107	28	Weak ..	2	2,320	47	24	64 1/2
Rennie's Improved	Aug.	24.....	99	37	Strong..	3	2,400	46	32	53
Argyle.....	"	24.....	99	37	"	3	3,020	45	20	53
Pioneer.....	"	27.....	102	39	"	4	2,580	44	8	53
Petschora	"	24.....	99	37	"	3	2,120	42	4	50 1/2
Albert.....	"	24.....	99	37	"	3	2,700	42	4	52 1/2
Baxter.....	"	24.....	99	38	"	3	2,700	40	20	53
Vanguard	"	24.....	99	37	"	3	2,700	40	20	51
*Phoenix	"	24.....	99	39	"	3	2,120	40	..	52 1/2
Excelsior.....	"	24.....	99	36	"	3 1/2	2,790	38	16	50 1/2
Success.....	"	24.....	99	33	"	3	2,690	37	24	45 1/2
Champion.....	"	24.....	99	36	"	3 1/4	2,720	36	32	49
Hulless, White.....	Sept.	1.....	107	28	Weak ..	2 1/2	2,380	35	..	63 1/2

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BARLEY, TWO-ROWED—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.
			Inches.		Inches.	Lbs.	Bush. Lbs.	Lbs.
Sidney.....	Aug. 24..	99	42	Strong.....	3 $\frac{1}{4}$	2,760	59 4	54 $\frac{1}{2}$
Invincible.....	Sept. 1..	107	37	".....	3 $\frac{1}{2}$	3,520	57 44	53 $\frac{1}{4}$
Standwell.....	" 4..	110	37	Weak.....	4	2,580	55 24	53
Clifford.....	Aug. 27..	102	50	Strong.....	4	3,500	55 ..	52 $\frac{1}{2}$
Danish Chevalier.....	Sept. 4..	110	36	Weak.....	5	3,980	53 36	52
Jarvis.....	Aug. 26..	101	48	Strong.....	4	3,020	52 24	52 $\frac{1}{2}$
Kinver Chevalier.....	Sept. 4..	110	36	Weak.....	5	2,560	51 32	51
Beaver.....	" 4..	110	35	".....	4	3,200	51 32	51 $\frac{1}{2}$
Canadian Thorpe.....	Aug. 28..	103	38	Strong.....	3 $\frac{1}{2}$	2,760	49 8	54 $\frac{1}{2}$
Harvey.....	" 27..	102	50	".....	4	3,800	48 36	54
Leslie.....	" 23..	98	42	".....	4	3,000	48 36	54
Newton.....	Sept. 4..	110	35	Weak.....	4	3,480	47 24	52 $\frac{1}{2}$
Prize Prolific.....	" 4..	110	36	".....	4 $\frac{1}{2}$	2,480	47 24	51
Bolton.....	Aug. 26..	101	38	Strong.....	4	3,000	45 40	53 $\frac{1}{2}$
Gordon ..	" 23..	98	43	".....	3 $\frac{1}{2}$	3,080	45 40	53 $\frac{1}{2}$
Victor.....	Aug. 26..	101	36	Strong.....	3 $\frac{1}{2}$	2,520	43 36	51
French Chevalier.....	Sept. 4..	110	34	Weak.....	5	2,940	43 16	51 $\frac{1}{2}$
Fulton.....	Aug. 27..	102	40	Strong.....	3	3,840	42 44	54
Logan.....	" 26..	101	40	".....	3 $\frac{3}{4}$	3,720	42 24	53
Dunham.....	" 24..	99	40	".....	4	2,880	42 4	52
Nepean.....	" 28..	103	38	".....	4	2,240	37 44	52 $\frac{1}{2}$

BARLEY—FIELD LOTS.

Name of Variety.	Culti- vation.	Size of Plot.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Char- acter of Straw.	Length of Head.	Kind of Head.	Yield per Acre.	Weight per Bushel.
		Acres.				Ins.		Inches.		Bush. Lbs.	Lbs.
Canadian Thorpe	Fallow .	2	May 17	Sept. 1	107	40	Strong..	3 $\frac{1}{4}$	2-rowed.	68 36	52 $\frac{1}{2}$
Sidney	" ..	5	" 17	" 1	107	41	" ..	3 $\frac{1}{2}$	" ..	66 ..	53 $\frac{1}{2}$
Invincible....	" ..	3 $\frac{1}{4}$	" 26	" 6	103	42	" ..	3 $\frac{3}{4}$	" ..	63 16	53 $\frac{1}{2}$
Royal.....	" ..	1	" 26	" 4	101	38	" ..	3 $\frac{1}{2}$	6-rowed.	56 ..	52 $\frac{1}{2}$
Rennie's Imprv'd	" ..	4 $\frac{3}{4}$	" 16	Aug. 20	96	42	" ..	3 $\frac{1}{4}$	" ..	51 ..	53
Standwell....	" ..	1 to 3	" 26	Sept. 6	103	36	Weak ..	3 $\frac{1}{2}$	2-rowed.	49 24	52 $\frac{1}{2}$

The Canadian Thorpe was badly rusted. Total area occupied 13 $\frac{5}{6}$ acres. Total yield of grain 829 bushels, 36 pounds, an average of 59 bushels 47 pounds per acre.

EXPERIMENTS WITH PEASE.

Fifty-seven varieties of pease were under trial in 1902. They were sown in plots of one-twentieth acre each, soil clay loam summer fallowed. Sown by hoe-drill at the rate 2 bushels of small pease, 2 $\frac{1}{2}$ bushels medium and 3 $\frac{1}{2}$ bushels of large pease per acre.

PEASE—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.		No. of Days Maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.		Weight per Bushel.
					In.	In.				
Alma.....	Sept.	8....	104	Strong....	52	3	Medium..	57	20	63
Daniel O'Rourke.....	"	1....	97	"	59	2 ¹ / ₄	Small	50	..	65
Prince.....	"	8....	104	"	53	3	Large....	48	40	63
Centennial..	"	9....	105	"	46	3	Small	46	..	63
Crown.....	"	12....	108	"	42	2 ¹ / ₂	"	45	20	65
Chancellor.....	"	12....	108	"	48	2	"	45	20	64 ¹ / ₂
White Wonder.....	"	12....	108	"	36	2 ³ / ₄	Medium..	45	..	64
Harrison's Glory.....	"	8....	104	Medium..	44	2 ¹ / ₂	Large....	42	40	65
Macoun.....	"	10....	106	Strong....	38	3	"	40	40	63
Paragon.....	"	12....	108	"	39	3	Medium..	40	20	63
Lanark.....	"	9....	105	"	44	3	Large....	40	..	63
Arthur.....	"	4....	100	"	40	2 ¹ / ₂	"	39	..	63
Early Britain.....	"	7....	103	"	39	2 ¹ / ₂	"	38	20	63 ¹ / ₂
English Grey.....	"	6....	102	"	41	2 ¹ / ₂	"	37	40	64 ¹ / ₂
Carleton.....	"	5....	101	"	53	2 ¹ / ₂	Medium..	37	..	64
New Potter.....	"	9....	105	"	40	3	Large....	37	..	63 ¹ / ₂
Gregory.....	"	12....	108	"	43	3	Medium..	36	40	64
French Canner.....	"	12....	108	"	45	3	Small	36	40	65
Mummy.....	"	8....	104	"	54	2 ¹ / ₄	Medium..	35	40	65
Perth.....	"	13....	109	"	46	3	Large....	35	20	62 ¹ / ₂
Cooper.....	"	8....	104	"	42	2 ¹ / ₄	Medium..	35	20	64
Prussian Blue.....	"	8....	104	"	46	2 ¹ / ₂	"	35	..	64
Pride.....	"	7....	103	"	42	2 ¹ / ₂	Large....	34	40	64
Mackay.....	"	10....	106	"	43	3	"	34	20	63 ¹ / ₄
Picton.....	"	9....	105	"	41	2 ³ / ₄	"	33	40	63 ¹ / ₂
Canadian Beauty.....	"	12....	108	"	50	3	"	33	40	63
Oddfellow.....	"	12....	108	"	46	3	"	33	20	64
Bruce.....	"	12....	108	"	50	2 ¹ / ₄	"	33	..	63 ¹ / ₂
Prince Albert.....	"	10....	106	"	45	2	"	33	..	64 ¹ / ₂
Fenton.....	"	10....	106	"	46	3	"	32	40	64 ¹ / ₂
Black Eyed Marrowfat.....	"	9....	105	"	39	3	"	32	20	63 ¹ / ₄
Creeper.....	"	6....	102	Medium..	42	2	Small	32	..	65 ¹ / ₄
Pearl.....	"	9....	105	Strong....	38	3	Large....	30	20	62 ¹ / ₂
King.....	"	12....	108	"	50	3	"	30	..	64
Nelson.....	"	12....	108	"	44	2 ³ / ₄	Medium..	30	..	63 ¹ / ₂
Victoria.....	"	10....	106	"	40	3	Large....	30	..	65
Bright.....	"	8....	104	"	44	2 ¹ / ₂	"	30	..	62
Herald.....	"	12....	108	"	40	3	Medium..	28	40	63 ¹ / ₂
Fergus.....	"	12....	108	"	36	3	Large....	28	20	64
Multiplier.....	"	12....	108	"	44	3	Small	28	20	64 ¹ / ₂
Elliot.....	"	10....	106	"	48	2 ¹ / ₂	Large....	28	..	65
Kent.....	"	12....	108	"	49	2 ³ / ₄	"	27	40	63 ¹ / ₂
Duke.....	"	10....	106	"	42	3	"	27	40	63 ¹ / ₂
Agnes.....	"	12....	108	"	50	3	"	26	40	65
Wisconsin Blue.....	"	12....	108	"	36	2 ¹ / ₂	Small.	26	20	64 ¹ / ₂
Elder.....	"	13....	109	"	41	2 ¹ / ₂	Medium..	25	40	63 ¹ / ₂
Golden Vine.....	"	12....	108	"	43	2 ¹ / ₄	Small	25	20	64
Vincent.....	"	10....	106	"	37	2	Large....	25	..	63
Bedford.....	"	12....	108	Small	43	3	Medium..	24	20	61 ¹ / ₂
Trilby.....	"	12....	108	"	45	3	Large....	22	20	61
German White.....	"	12....	108	"	50	3	"	21	..	61 ¹ / ₂
Chelsea.....	"	13....	109	"	46	3	Small	19	20	64
Elephant Blue.....	"	7....	103	"	44	2	Medium..	18	40	64
Dover.....	"	12....	108	"	44	3	Large....	18	20	62 ¹ / ₂
Large White Marrowfat.....	"	10....	106	"	41	3	"	17	40	66
Archer.....	"	13....	109	"	40	3	Medium..	17	..	63 ¹ / ₂
*Grass Pea.....										

*Destroyed by frost.

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EXPERIMENTS WITH INDIAN CORN.

Thirty-seven varieties of Indian corn were sown on May 29, in rows thirty-six inches apart, by grain drill; and for comparison planted by hand in hills three feet apart on the same date.

Both plots were cut for ensilage on September 8. The yield was computed from the weight of corn on two rows, each sixty-six feet long.

The land used was a well prepared summer-fallow a clay loam.

On account of the cold, wet spring, the growth was very backward, and the crop was one of the lightest ever grown on the farm.

INDIAN CORN—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	Height.	Condition when Cut.	Weight per Acre grown in Rows.		Weight per Acre grown in Hills.	
				Tons.	Lbs.	Tons.	Lbs.
Salzer's All Gold.....	Medium...	50	Not in tassel..	9	1,800	5	32
Selected Leaming.....	Strong.....	47	Tassel.....	9	348	4	1,900
King Philip.....	".....	55	".....	8	1,820	7	1,700
Pearce's Prolific.....	".....	45	".....	8	1,688	3	732
Early Butler.....	Medium.....	46	Not in tassel..	8	1,028	5	1,748
Rural Thoroughbred White Flint.....	Strong.....	44	".....	8	368	6	936
Compton's Early.....	".....	43	Tassel.....	8	368	6	1,200
Champion White Pearl.....	".....	50	Not in tassel..	8	206	4	1,900
King of the Earliest.....	Medium.....	40	".....	7	1,972	5	824
Giant Prolific Ensilage.....	Strong.....	47	".....	7	1,840	4	580
Pride of the North.....	Medium.....	50	".....	7	1,708	3	1,128
Mitchell's Extra Early.....	Strong.....	46	Early milk....	7	124	2	1,412
Eureka.....	".....	56	Not in tassel..	7	124	4	1,108
Early Yellow Long Eared.....	".....	50	Tassel.....	6	1,860	5	956
Black Mexican.....	Medium.....	39	Early milk....	6	1,596	3	336
Mammoth Cuban.....	".....	38	Not in tassel..	6	1,464	4	448
Red Cob Ensilage.....	Strong.....	54	Tassel.....	6	1,332	5	692
Yellow Six Weeks.....	Medium.....	36	Early milk....	6	1,200	3	1,920
Sanford.....	Strong.....	45	Tassel.....	6	1,068	5	1,352
White Cap Yellow Dent.....	Medium.....	47	Not in tassel..	6	804	5	296
Wisconsin Earliest White Dent.....	".....	51	Tassel.....	6	672	5	1,880
North Dakota Yellow.....	".....	47	".....	6	408	3	1,128
Evergreen Sugar.....	Weak.....	41	Not in tassel..	6	12	4	448
Cloud's Early Yellow.....	Strong.....	50	".....	5	1,088	5	1,220
Longfellow.....	".....	47	Tassel.....	5	296	4	580
Angel of Midnight.....	Medium.....	49	".....	4	1,900	3	336
Superior Fodder.....	".....	48	Not in tassel..	4	1,768	4	712
Extra Early Huron.....	".....	43	Tassel.....	4	1,636	3	1,656
North Dakota White.....	".....	39	".....	4	184	3	204
Salzer's Earliest Ripe.....	Weak.....	33	Not in tassel..	3	1,920	3	204
Early Golden Surprise.....	Medium.....	48	".....	3	1,656	6	936
Kendall's Early Giant.....	Weak.....	46	Tassel.....	3	468	2	1,148
Canada White Flint.....	Medium.....	43	".....	3	72	3	996
Mammoth Eight-rowed Flint.....	Weak.....	36	".....	3	72	4	844
Early Mastodon.....	Medium.....	44	Not in tassel..	2	356	1	640
Early August.....	Weak.....	23	Early milk....	1	1,696	1	244
Country Gentleman.....	".....	33	Not in tassel..	1	1,300	1	1,564

INDIAN CORN.—TEST OF SEEDING AT DIFFERENT DISTANCES.

Sown in rows by grain seeder on May 29. Cut September 8. Cultivation of the land the same as for the preceding test.

Name of Variety.	Distance between rows.	Character of Growth.	Height.	Weight per Acre grown in rows.	
	Inches.		Inches.	Tons	Lbs.
Selected Leaming	21	Strong	47	4	712
"	28	"	49	2	1,412
"	35	"	53	5	692
"	42	"	57	5	428
Longfellow.	21	Medium	45	4	52
"	28	"	46	5	32
"	35	"	46	5	560
"	42	"	49	5	428
Champion White Pearl	21	"	41	3	1,656
"	28	"	48	3	1,656
"	35	"	49	7	1,576
"	42	"	49	7	1,920

ROTATION OF CROPS.

The plan inaugurated in 1899 for a rotation of crops was again carried out as follows :—

No.	1899.	1900.	1901.	1902.
1	Wheat	Oats.	Soja Beans	Wheat.
2	Wheat	Wheat	Pease	Wheat.
3	Wheat	Oats.	Tares.	Wheat.
4	Wheat	Wheat	Red Clover	Wheat.
5	Wheat	Barley.	Alsike and Lucerne ..	Wheat.
6	Pease	Wheat	Wheat	Pease.
7	Tares.	Wheat	Oats.	Tares.
8	Soja Beans	Wheat	Oats.	Soja Beans.
9	Red Clover	Wheat	Wheat	Red Clover.
10	Alsike and Lucerne.	Wheat	Barley	Alsike and Lucerne.
11	Rape.	Wheat	Summer-fallow	Rape.
12	Wheat	Wheat	Summer-fallow	Wheat.
13	Wheat	Oats.	Summer-fallow	Wheat.
14	Wheat	Barley.	Summer-fallow	Wheat.
15	Wheat	Wheat	Oats.	Wheat.
16	Wheat	Barley.	Oats.	Wheat.
17	Oats.	Soja Beans	Wheat	Oats.
18	Wheat	Pease.	Wheat	Wheat.
19	Oats.	Tares.	Wheat	Oats.
20	Wheat	Red Clover	Wheat	Wheat.
21	Barley.	Alsike and Lucerne.	Wheat	Barley.
22	Rye	Summer-fallow.	Wheat	Rye.

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ROTATION TEST—Results obtained in 1902. Plots ½-acre each. Soil, clay loam.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.	Weight per Bushel.
					In.	In.	In.		Bush. Lbs.	Lbs.
1	Wheat, Red Fife.....	April 28..	Aug. 27..	121	43	Strong....	3	Bald ...	25 ..	60
2	"	" 28..	" 27..	121	43	"	3	" ...	24 30	60
3	"	" 28..	" 27..	121	45	"	3½	" ...	27 ..	59
4	"	" 28..	" 27..	121	45	"	3½	" ...	27 15	58½
5	"	" 28..	" 27..	121	42	"	3	" ...	20 45	58
6	Pease.....	May 30..	Ploughed under, 7 inches deep, on August 13.							
7	Tares.....	" 30..	"	"	"	"	"	"		
8	Soja Beans	" 30..	"	"	"	"	Sept. 5.	"		
9	Red Clover	" 30..	"	"	"	"	" 6.	"		
10	Alsike and Lucerne..	" 30..	"	"	"	"	" 8.	"		
11	Rape.	" 30..	"	"	"	"	" 8.	"		
12	Wheat, Red Fife.....	April 28..	Aug. 28..	122	36	Strong....	23½	Bald ...	18 45	53½
13	"	" 28..	" 28..	122	38	"	3	" ...	22 30	54
14	"	" 28..	" 28..	122	38	"	3	" ...	20 50	54½
15	"	" 28..	" 28..	122	44	"	3	" ...	27 15	58
16	"	" 28..	" 28..	122	40	"	3	" ...	22 45	57
17	Oats, Banner	May 7..	" 24..	109	47	"	9	Branc'g.	31 16	36
18	Wheat, Red Fife.....	April 28..	Sept. 1..	126	43	"	3	Bald ...	25 ..	58
19	Oats, Banner	May 7..	Aug. 29..	114	50	"	9½	Branc'g.	32 26	38½
20	Wheat, Red Fife	April 28..	Sept. 1..	126	44	"	3	Bald ...	27 ..	59½
21	Barley, Rennie's Im- proved	May 17..	Aug. 21..	96	36	"	2	6 rowed.	26 12	53
22	Rye, Spring	April 28..	Sept. 1..	126	42	"	3	.....	25 ..	61

ROTATION OF CROPS.—Summary of results for three years.

Number.	Variety.	Yield.	Variety.	Yield.	Variety.	Yield.
	1900.	Bush. Lbs.	1901.	Bush. Lbs.	1902.	Bush. Lbs.
1	Oats, Banner	11 2	Soja Beans, ploughed under Aug. 21		Wheat, Red Fife.....	25 ..
2	Wheat, Red Fife....	4 20	Pease, ploughed under July 26.....		"	24 30
3	Oats, Banner	11 ..	Tares, ploughed under July 10.....		"	27 ..
4	Wheat, Red Fife... ..	5 ..	Red Clover, ploughed under Sept. 3		"	27 15
5	Barley, Canadian Thorpe	9 44	Clover, Alsike and Lucerne, ploughed under Sept. 5		"	20 45
6	Wheat, Red Fife.....	16 50	Wheat, Red Fife.....	38 52	Pease, "ploughed under Aug. 13	
7	"	19 30	Oats, Banner	97 32	Tares, ploughed under Aug. 13	
8	"	18 20	"	91 8	Soja Beans, ploughed under Sept. 5	
9	"	11 20	Wheat, Red Fife.....	38 ..	Red Clover, ploughed under Sept. 6	
10	"	8 20	Barley, Sidney.....	50 36	Alsike and Lucerne, ploughed under Sept. 8	
11	"	10 40	Summer-fallow.....		Rape, ploughed under Sept. 8	
12	"	7 40	"		Wheat, Red Fife.....	18 45
13	Oats, Banner.....	9 14	Summer-fallow, ploughed June 5.....		"	22 40

ROTATION OF CROPS—Summary of results for three years—*Concluded.*

Number.	Variety.	Yield.		Variety.	Yield.		Variety.	Yield.	
	1900.	Bush.	Lbs.	1901.	Bush.	Lbs.	1902.	Bush.	Lbs.
14	Barley, Canadian Thorpe	4	32	Summer-fallow.....			Wheat, Red Fife..	20	50
15	Wheat, Red Fife.....	4	30	Oats, Banner.....	80	26	".....	27	15
16	Barley, Canadian Thorpe	9	4	".....	98	8	".....	22	45
17	Soja Beans, ploughed under Aug. 3.....			Wheat, Red Fife.....	43	44	Oats, Banner.....	31	16
18	Pease, ploughed under July 28.....			".....	43	18	Wheat, Red Fife.....	25	..
19	Tares, ploughed under July 28.....			".....	43	2	Oats, Banner.....	32	26
20	Clover, Common Red, ploughed under Sept. 10.....			".....	42	16	Wheat, Red Fife.....	27	..
21	Alsike and Lucerne, ploughed under Sept. 10.....			".....	43	12	Barley, Rennie's Impr'vd	26	12
22	Summer-fallow.....			".....	44	40	Rye.....	25	..

EXPERIMENTS WITH FLAX.

Sowing different quantities of seed per acre and at different dates. Soil, clay loam, summer-fallowed. Sown by hoe-drill in plots of 1-20th acre each.

Seed per acre.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Weight of Straw.	Yield per Acre	
				Inches.	Lbs.	Bush.	Lbs.
25 pounds.....	May 17..	Aug. 21..	96	27½	1,900	14	8
60 ".....	" 17..	" 19..	94	28½	2,500	16	16
40 ".....	" 17..	" 20..	95	30	2,000	13	8
40 ".....	" 26..	" 28..	94	28	1,980	14	
80 ".....	" 26..	" 30..	96	26	1,620	12	28
80 ".....	" 17..	" 21..	96	27	2,440	15	

EXPERIMENTS WITH MILLETS.

Five varieties were sown on May 30, on 1-20th acre plots of fallow. When cut green for ensilage on September 9, no seed had formed.

Variety.	Height.	Green Fodder per Acre.	
		T	ons. Lbs.
Italian.....	38	15	1,356
Moha Hungarian.....	40	11	646
Algerian.....	36	8	1,420
White Round French...	42	8	1,420
Cat-tail.....	36	4	710

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EXPERIMENTS WITH SOJA BEANS.

Sown on May 30, on 1-20th acre plots of fallowed land, clay loam. Cut for ensilage on September 9. Did not form seed.

Variety.	Rows Distance apart.	Height.	Yield per Acre. (Green)	
	Inches.		Tons.	Lbs.
Soja Beans.....	21	33	3	336
".....	28	35	3	1,656
".....	35	36	4	184

EXPERIMENTS WITH HORSE BEANS.

Sown May 20 on 1-20th acre plots of fallowed land, clay loam. Cut for ensilage September 9, About half of beans ripe when cut.

Variety.	Rows Distance Apart.	Height.	Yield per Acre, Green.	
	Inches.	Inches.	Tons.	Lbs.
Horse beans.....	21	48	10	592
".....	28	52	11	176
".....	35	52	11	176

EXPERIMENTS WITH SPRING RYE.

Sown April 19, on 1-20th acre plot of fallow.

Cut August 20. Days to mature, 123. Straw, strong, 43 inches long. Heads 3 inches. Yield, 23 bushels 40 lbs. per acre.

EXPERIMENT WITH CANARY GRASS.

(*Phalaris canariensis*.)

Sown May 17 on 1-20th acre plot of fallow. Cut September 3. Days to mature, 109. Yield, 21 bushels 30 lbs. per acre.

EXPERIMENT WITH SUNFLOWERS.

Variety, Russian. Sown May 19, on 1-20th acre plot of fallow. No seed had formed when frost came, and the crop was a total failure.

HAY CROP.

A good average crop was secured in excellent condition from the various seedings of Brome and Western Rye Grass.

YIELDS.

BROME GRASS. (*Bromus inermis*).

1st crop.—Left for seed.

2nd crop.—25 acres, 1 ton 1,950 lbs. per acre.

2-3 EDWARD VII., A. 1903

2nd crop.— 4 acres, 2 tons 805 lbs. per acre.

3rd crop.— 3 acres, 3 tons 15 lbs. per acre. (Manured.)

WESTERN RYE GRASS. (*Agropyrum tenerum*).

1st crop.— $12\frac{3}{4}$ acres, 2 tons 297 lbs. per acre.

1st crop.— $1\frac{1}{2}$ acres, 4 tons 235 lbs. per acre.

2nd crop.— $2\frac{1}{2}$ acres, 3 tons 153 lbs. per acre.

MIXED BROME AND WESTERN RYE GRASS.

1st crop.—5 acres, 2 tons 66 lbs. per acre.

2nd crop.— $\frac{1}{2}$ acre, 2 tons 1,580 lbs. per acre.

1902 SEEDING.

Brome grass.—23 acres of stubble land was ploughed 4 inches deep on June 1, and sown with Brome grass. Abundant rainfall at the time of seeding and afterwards caused one of the best catches ever secured on the farm.

Western Rye Grass.—4 acres of land was prepared in the same manner as mentioned above, and sown with Western Rye grass. An exceptionally good catch was secured.

SEEDING AND CULTIVATION OF BROME GRASS.

For information regarding the seeding and cultivation of Brome grass the following is quoted from the report of 1896 :—

‘This grass is better sown alone ; at least it should not be sown with a grain crop. The grain takes too much moisture from the young grass-plants, only the most vigorous of which will survive the dry weather in September ; whereas, if sown alone all the plants have an equal chance.

‘It is advisable to sow the seed on land that does not blow. Summer-fallow would be the best preparation, but on account of its liability to drift it is not safe in many parts of the Territories to use this kind of land. Stubble-land ploughed three or four inches deep in April or May, and well harrowed after the seed is sown is found to be quite safe from winds, as the stubble harrowed to the top prevents all drifting.

‘Ten or twelve pounds of seed is required per acre. More seed will give a better crop the first year, but less afterwards, as the roots thicken up each year, and in three or four years this grass makes better pasture than hay.

‘The seed being light, long and thin, seeding by hand is the only practicable method unless seeders constructed for the purpose are available. To seed properly a calm day should be chosen, so that all parts of the land may be evenly sown.

‘While the plants are young, weeds are sure to make great headway, and it is necessary to keep them at least from going to seed. The quickest way to accomplish this is to go over the field with a mower, cutting just above the grass plants. If this operation has to be repeated it will be necessary to cut the tops of the grass, but this will not injure the plants, in fact it is an advantage in the way of giving the roots a firmer hold.

‘The first crop of hay can be cut the next year after seeding, and will, in ordinary years, be ready early in July. Twenty days after being ready to cut for hay it will be fit to cut for seed if so desired.

‘On this farm it has always been cut in first bloom for hay, and twenty days from this time it is considered in proper condition to cut for seed.

‘In cutting for seed, a binder is used and the grass is cut, tied and stooked the same as wheat or other grain. In a week or ten days after cutting it is ready to thresh or store away.

‘For threshing small quantities, the old-fashioned flail is suitable, but for large lots a threshing machine should be used on which the wind has been shut off as much as practicable. From three to six hundred pounds of seed may be expected from an acre.’

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CLOVERS AND GRASSES.

LUCERNE AND RED CLOVER.

One-half acre was sown with lucerne and the same area with red clover on June 7. Good catches were secured and the growth made was quite satisfactory.

TIMOTHY.

One-half acre was sown with timothy on June 7. A splendid catch was secured. When frost came the plants were 12 inches high and nearly all in head.

ORCHARD GRASS.

One-half acre was sown with orchard grass on June 7. About 75 per cent of the seed failed to germinate. Growth, weak.

EXPERIMENTS WITH FIELD ROOTS.

Fallowed land, clay loam, was used for all tests with field roots. All varieties came up evenly and made a good showing in the early part of the season, but the crop, with the exception of the first seeding of carrots, was seriously affected by the dry weather of July, August and September.

The roots, though small, were sound and of good quality. The yield was computed from two rows each 66 feet long and 33 inches apart.

EXPERIMENTS WITH TURNIPS.

Twenty-nine varieties were under trial in 1902. The first sowing was on May 28, the second on June 7, and the roots were all pulled October 5.

TURNIPS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Good Luck.....	17	680	578	..	13	880	448	..
Webb's New Renown.....	17	440	574	..	18	1,680	628	..
Halewood's Bronze Top.....	17	320	572	..	12	1,440	424	..
Imperial Swede.....	16	1,960	566	..	12	1,920	432	..
Bangholm Selected.....	16	880	548	..	10	1,600	360	..
Giant King.....	16	160	536	..	11	800	380	..
Perfection Swede.....	16	160	536	..	14	800	480	..
New Arctic.....	16	160	536	..	12	720	412	..
Prize Winner.....	15	1,920	532	..	11	1,040	384	..
Mammoth Clyde.....	15	1,800	530	..	12	960	416	..
East Lothian.....	15	1,680	528	..	13	640	444	..
Sutton's Champion.....	15	1,320	522	..	10	1,600	360	..
Shamrock Purple Top.....	15	480	508	..	11	1,520	392	..
Hall's Westbury.....	15	480	508	..	11	80	368	..
Magnum Bonum.....	15	120	502	..	10	640	344	..
Drummond Purple Top.....	14	1,640	494	..	12	1,200	420	..
Monarch.....	14	1,640	494	..	11	80	368	..
Emperor Swede.....	14	1,520	492	..	12	1,680	428	..
Champion Purple Top.....	14	1,400	490	..	12	960	416	..
Jumbo.....	14	1,400	490	..	13	400	440	..
New Century.....	14	1,280	488	..	13	1,000	460	..
Kangaroo.....	14	1,160	486	..	12	..	400	..
Carter's Elephant.....	14	1,040	484	..	14	320	472	..
Elephant's Master.....	14	920	482	..	6	480	208	..
Prize Purple Top.....	14	920	482	..	12	920	432	..
Marquis of Lorne.....	14	560	476	..	12	240	404	..
Selected Purple Top.....	13	1,960	466	..	11	80	368	..
Skirving's.....	13	280	458	..	9	720	312	..
West Norfolk Red Top.....	12	1,560	426	..	9	960	316	..

EXPERIMENTS WITH MANGELS.

Twenty-seven varieties of mangels were under trial. Two sowings were made in each case, the first on May 28 the second on June 2 and the roots were pulled from both on October 3.

MANGELS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre, 1st Plot.		Yield per Acre, 1st Plot.		Yield per Acre, 2nd Plot.		Yield per Acre, 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Giant Yellow Intermediate	15	600	510	..	8	1,040	284	..
Ward's Long Oval-shaped	15	240	504	..	6	240	204	..
Giant Yellow Half-long	14	1,640	494	..	8	1,520	292	..
Yellow Intermediate	14	320	472	..	10	400	340	..
Selected Yellow Globe	14	200	470	..	10	1,600	360	..
Triumph Yellow Globe	13	1,600	460	..	11	80	368	..
Mammoth Long Red	13	1,480	458	..	9	480	308	..
Prize Mammoth Long Red	13	1,240	454	..	6	1,680	228	..
Leviathan Long Red	13	1,000	450	..	10	160	336	..
Half-long Sugar White	13	880	448	..	9	1,200	320	..
Golden Fleshed Tankard	13	880	448	..	7	880	248	..
Mammoth Yellow Intermediate	13	760	446	..	7	1,840	264	..
Half-long Sugar Rosy	13	520	442	..	6	1,440	224	..
Lion Yellow Intermediate	13	280	438	..	9	..	300	..
Yellow Fleshed Tankard	13	280	438	..	7	100	240	..
Prize Winner Yellow Globe	13	40	434	..	8	1,760	296	..
Gate-post	12	1,440	424	..	8	1,280	288	..
Gate-post Yellow	12	1,320	422	..	9	1,440	324	..
Red Fleshed Tankard	12	1,200	420	..	9	960	316	..
Selected Mammoth Long Red	12	480	408	..	9	960	316	..
Giant Yellow Globe	12	240	404	..	8	1,640	284	..
Warden Orange Globe	11	1,040	384	..	5	1,280	188	..
Mammoth Oval-shaped	11	1,040	384	..	7	1,600	260	..
Canadian Giant	11	1,040	384	..	9	..	300	..
Norbiton Giant	11	920	382	..	8	560	276	..
Champion Yellow Globe	11	320	372	..	9	..	300	..
Giant Sugar	10	1,840	364	..	8	800	280	..

EXPERIMENTS WITH CARROTS.

Twenty varieties of carrots were under trial during 1902. The first sowings were made on April 30, the second on May 28, and the roots from both were pulled on October 5.

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CARROTS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre, 1st Plot.		Yield per Acre, 1st Plot.		Yield per Acre, 2nd Plot.		Yield per Acre, 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Iverson's Champion.....	17	1,280	588	..	10	160	336	..
Giant White Vosges.....	16	1,120	552	..	8	1,040	284	..
New White Intermediate.....	15	960	516	..	7	880	248	..
Green-top White Orthe.....	14	1,760	496	..	8	1,760	296	..
Ontario Champion.....	14	1,520	492	..	8	560	276	..
Half-long White.....	14	800	480	..	10	1,360	356	..
Half-long Chantenay.....	14	560	476	..	9	..	300	..
Long Yellow Stump-rooted.....	14	80	468	..	8	560	276	..
Improved Short White.....	13	1,840	464	..	10	400	340	..
Early Gem.....	12	600	410	..	7	400	240	..
Mammoth White Intermediate.....	11	1,760	396	..	7	1,600	260	..
White Belgian.....	11	1,760	396	..	6	960	216	..
Guerande or Ox-heart.....	11	1,280	388	..	5	1,520	192	..
Long Orange or Surrey.....	11	200	370	..	6	480	208	..
Carter's Orange Giant.....	10	1,360	356	..	7	640	244	..
Yellow Intermediate.....	10	1,000	350	..	5	1,760	196	..
White Vosges Large Short.....	9	1,680	328	..	5	1,760	196	..
Scarlet Intermediate.....	8	680	278	..	7	400	240	..
Long Scarlet Altringham.....	7	640	244	..	5	1,040	184	..
Scarlet Nantes.....	6	120	202	..	4	640	144	..

EXPERIMENTS WITH SUGAR BEETS.

Nine varieties of sugar beets were tested in 1902. The first sowing was made on May 28, the second on June 7, and the roots from both were pulled on October 3.

SUGAR BEETS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Imperial.....	11	1,400	390	..	8	1,040	284	..
Danish Improved.....	10	1,720	362	..	8	1,040	284	..
Royal Giant.....	10	400	340	..	9	480	308	..
Danish Red Top.....	9	1,200	320	..	5	1,520	292	..
Vilmorin's Improved.....	8	680	278	..	5	320	172	..
Red Top Sugar.....	8	560	276	..	9	..	300	..
Wanzleben.....	7	1,480	258	..	6	1,920	232	..
French Very Rich.....	5	1,880	198	..	6	960	216	..

EXPERIMENTS WITH POTATOES.

Eighty-nine varieties of potatoes were under trial during 1902. These were planted on May 7 in drills 2½ feet apart with the sets about 14 inches apart. The soil was clay loam, summer-fallowed. The potatoes were dug October 2, and the yield per acre has been estimated from the weight of tubers in one row 132 feet long. There was no rot observed in any of the varieties.

POTATOES—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	Average Size.	Total Yield per Acre.	Yield per Acre of Marketable.	Yield per Acre of Unmarketable.	Form and Colour.
			Bush. Lbs.	Bush. Lbs.	Bush. Lbs.	
Country Gentleman	Strong ..	Medium	301 24	272 48	28 36	Long, pink.
New Queen	" ..	" ..	288 12	268 24	19 48	Oval "
Beauty of Hebron	" ..	Large ..	286 ..	277 12	8 48	Long "
Brownell's Winner	" ..	Medium	281 36	250 48	30 48	" red.
New Variety No. 1.	" ..	Large ..	275 ..	259 36	15 24	Round, white.
Carman No. 1	" ..	" ..	274 24	253 ..	21 24	Oval "
Seedling No. 7	" ..	" ..	272 48	255 12	17 36	" red.
Lee's Favourite	Medium	Medium	270 36	242 ..	28 36	" "
Earliest of All	" ..	" ..	268 24	253 ..	15 24	Long, pink.
American Giant	Strong.	" ..	266 12	250 48	15 24	" white.
Early Harvest	" ..	" ..	266 12	250 48	15 24	Oval "
Moneymaker	Medium	" ..	266 12	250 48	15 24	Long "
Pride of the Market	Strong ..	Large ..	266 12	261 48	4 24	Oval "
Seattle	" ..	Medium	266 ..	246 12	19 48	Long "
Reeve's Rose	Medium	" ..	261 48	250 48	11 ..	" red.
Carman No. 3	Strong ..	Large ..	259 36	250 48	8 48	Oval, white.
Rose No. 9	" ..	" ..	257 24	244 12	13 12	Long, red.
Vick's Extra Early	Medium	Medium	255 12	242 ..	13 12	Oval, pink.
Maule's Thoroughbred	Strong ..	Large ..	255 12	228 48	26 24	Long, red.
Columbus	" ..	" ..	253 ..	222 12	30 48	" "
Great Divide	" ..	Medium	253 ..	239 48	13 12	" white.
Northern Spy	" ..	Large ..	250 36	237 24	15 24	Oval, red.
Lizzie's Pride	Medium	" ..	248 36	239 48	8 48	Long, white.
Burnaby Seedling	Strong ..	Medium	248 36	228 48	19 48	" pink.
Green Mountain	" ..	" ..	246 24	231 ..	15 24	" white.
Hale's Champion	" ..	Small ..	246 24	217 48	28 36	Round "
Dreer's Standard	" ..	Medium	242 ..	228 48	13 12	Oval "
Early Michigan	" ..	" ..	242 ..	231 ..	11 ..	" "
General Gordon	" ..	Large ..	242 ..	226 36	15 24	Long, red.
State of Maine	" ..	Medium	239 48	217 48	22 ..	Oval, white.
Troy Seedling	" ..	Small ..	237 36	213 24	24 12	" "
Bovee	" ..	Medium	235 24	224 24	11 ..	" pink.
Sharpe's Seedling	Strong ..	Large ..	235 24	206 48	28 36	Long, red.
Uncle Sam	" ..	Medium	235 24	215 36	19 48	Oval, white.
Holborn Abundance	" ..	" ..	233 12	217 48	15 24	" "
Sabean's Elephant	" ..	" ..	233 12	217 48	15 24	Long, white.
Flemish Beauty	Medium	Large ..	231 ..	215 36	15 24	Long, red.
Swiss Snowflake	Strong ..	Small ..	231 ..	224 24	6 36	Round, white.
Prolific Rose	" ..	Medium	231 ..	213 24	17 36	Long, pink.
Clay Rose	" ..	Small ..	231 ..	217 48	13 12	Round, red.
Rochester Rose	" ..	Medium	228 48	213 24	15 24	Long, red.
Seedling No. 230	Medium	Small ..	228 48	215 36	13 12	Oval, white.
Chicago Market	" ..	Medium	228 48	211 12	17 36	" "
I. X. L.	Strong ..	" ..	228 48	215 36	13 12	Long, pink.
Maggie Murphy	" ..	" ..	228 48	222 12	6 36	" "
Wonder of the World	Medium	" ..	226 36	202 24	24 12	Oval, pink.
Quaker City	Strong ..	Small ..	226 36	217 48	8 48	" white.
American Wonder	" ..	Large ..	226 36	213 24	13 12	" "
Dakota Red	" ..	" ..	226 36	217 48	8 48	" red.
Prize Taker	" ..	Medium	224 12	213 24	11 ..	Long, red.
Penn Manor	" ..	" ..	222 12	206 48	15 24	Oval, pink.
Early Rose	" ..	Small ..	217 48	193 36	24 12	" "
Pearce's Extra Early	" ..	Medium	216 12	192 ..	24 12	Long, pink.
Pearce's Prize Winner	" ..	" ..	215 36	202 24	13 12	" white.
Late Puritan	" ..	" ..	213 24	200 12	13 12	" "
Early St. George	" ..	" ..	211 12	200 12	11 ..	" pink.
Burpee's Extra Early	" ..	Small ..	211 12	195 48	15 24	Oval, pink.
Canadian Beauty	Medium	Medium	209 ..	191 24	17 36	Long, pink.
Early Norther	" ..	Small ..	209 ..	191 24	17 36	" red.
Up-to-Date	Strong ..	" ..	206 48	189 12	17 36	Oval, white.
Daisy	" ..	Medium	206 48	171 36	35 12	Round, pink.
Rawdon Rose	" ..	" ..	206 48	195 48	11 ..	Oval, pink.
Empire State	" ..	" ..	204 36	184 48	19 48	" white.
McIntyre	" ..	Small ..	204 36	184 48	19 48	" pink.
Early Sunrise	" ..	" ..	202 24	187 ..	15 24	" "

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POTATOES—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Character of Growth.	Average Size.	Total Yield per Acre.		Yield per Acre of Market-able.		Yield per Acre of Un-market-able.		Form and Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Cambridge Russet.....	Medium	Medium	202	24	189	12	13	12	Long, russet.
Delaware.....	Strong..	"	202	24	195	48	6	36	Oval, white.
Irish Daisy.....	"	Small ..	195	48	176	..	19	48	Round, white.
Early White Prize.....	"	Large ..	193	36	176	..	17	36	Oval, white.
Thorburn.....	"	Medium	191	24	180	24	11	..	" pink.
Irish Cobbler.....	"	Small ..	189	12	176	..	13	12	" white.
Bill Nye.....	"	"	187	..	169	24	17	36	Long, white.
Polaris.....	Medium	Medium	187	..	171	36	15	24	Oval, white.
White Beauty.....	"	"	184	48	167	12	17	36	" "
Early Market.....	Strong..	Small ..	182	36	165	..	17	36	" pink.
Early Puritan.....	"	"	182	36	165	..	17	36	" white.
Everett.....	Medium	Medium	182	36	171	36	11	..	Long, red.
Rural Blush.....	Strong..	"	182	36	176	..	6	36	Oval, red.
Early Ohio.....	"	"	180	24	162	48	17	36	" pink.
Rural No. 2.....	"	"	180	24	162	48	17	36	" white.
Enormous.....	"	"	169	24	156	12	13	12	" "
Vanier.....	"	"	169	24	154	..	15	24	Long, red.
Sir Walter Raleigh.....	"	"	154	..	138	36	15	24	Oval, white.
Reading Giant.....	"	"	149	36	121	..	28	36	" red.
Early Six Weeks.....	"	Small ..	149	36	140	48	8	48	" pink.
Ohio Junior.....	"	"	145	12	132	..	13	12	" "
Houlton Rose.....	Medium	"	145	12	134	12	11	..	Long, pink.
Early Andes.....	Strong..	Medium	140	48	129	48	11	..	" "
Brown's Rot-proof.....	"	"	112	12	105	36	6	36	" red.

VEGETABLE GARDEN.

ASPARAGUS.

Old beds of Barr's Mammoth, Barr's Elmira and Conover's Colossal produced an excellent crop during the season. In use from May 23 to July 22.

BEANS.—Sown May 14.

Variety.	In use, Green.		Ripe.		Remarks.
Haricot Inexhaustible.....	Aug.	5....	Sept.	16....	Green; good cropper.
Matchless.....	"	5....	"	16....	" fair cropper.
Black Speckled.....	July	30 ..	"	16....	" good cropper.
Golden Skinless.....	"	30....	"	3....	Wax or butter; good cropper.
Emperor of Russia.....	Aug.	2....	"	16....	Green; good cropper; late.
Early Six-weeks.....	July	30....	"	3....	" " early.
Valentine Wax.....	"	5....	"	16....	" fair cropper.
Challenge Black Wax.....	Aug.	2....	"	3 ..	Wax; good cropper.
Stringless Wax.....	"	5....	"	16 ..	" " late.
Fame of Vitry.....	July	30....	"	16..	Green; good cropper.
Dwarf Kidney.....	Aug.	2....	"	16....	Wax; good cropper.
Golden Wax.....	"	2....	"	3....	" fair cropper.
Detroit Wax.....	July	30....	"	3....	" good cropper.
Extra Early.....	"	30....	"	3....	Green; good cropper; early.
Early Mohawk.....	"	30....	"	16....	" early.
Currie's Rust-proof.....	"	30....	"	3....	Wax; good cropper.

2-3 EDWARD VII., A. 1903

BEETS.

Sown May 16 ; in use July 25 ; pulled October 3.

Nutting's Dwarf Improved, 422 bushels per acre.

Flat Egyptian, 365 bushels per acre.

Long Smooth Blood, 309 bushels per acre.

Early Black Red Turnip, 293 bushels per acre.

BROCOLI.

Sown April 7 ; transplanted April 22 ; set out May 23.

Extra Early White, did not mature.

Dwarf Improved, did not mature.

CELERY.

Giant Pascal, Large Red Ribbed, Rose Ribbed Paris, Paris Golden Yellow, White Plume and White Walnut were sown in hot-house March 31 ; transplanted April 30 ; set out in trenches June 20 ; in use September 27 ; taken up October 8.

Giant Pascal and Large Red Ribbed did not do well ; but the other varieties produced an excellent crop of very fine, crisp celery.

CAULIFLOWER.

Sown in hot-house April 2 ; transplanted April 22 ; set out May 22.

Earliest Dwarf, in use July 17 ; average weight, 4 lbs.

Half Early Paris, in use July 17 ; average weight, 4 lbs.

Early Snowball, in use July 28 ; average weight, 4½ lbs.

Large Algiers, in use August 5 ; average weight, 6 lbs.

CARROTS.—Sown, May 8 ; Lifted, October 3.

Variety.	In use.	Bushels per Acre.	Remarks.
Early Gem	Aug. 30....	405	Large ; Good shape.
Long Blood.....	" 30....	394	Large ; rough.
Half Long Luc.....	July 30....	363	Good variety.
Parisian Forcing.	" 30....	363	"
French Horn.....	" 30....	343	"
Scarlet Nantes	Aug. 30....	202	Small ; smooth.

CABBAGE.—Sown in Hot-house, April 2 ; Transplanted to frame, April 22 ; Set out, May 23 ; Taken up, October 8.

Variety.	In use.	Average Weight.	Remarks.
		Lbs.	
Winningstadt Early.....	Aug. 5....	7	Good ; early.
Extra Early Express	" 5....	7	"
Extra Early Etampes.....	July 20....	5	"
St. Denis	Aug. 5....	10	
Paris Market.....	" 5....	5	
Early Jersey Wakefield.....	" 5....	6	
Fottler's Drumhead	" 5....	13	
Large Red Drumhead	July 15....	9	Good.
Green Globe Savoy.....	Aug. 5....	6	

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CORN.—Planted, May 27.

Ring-leader, in use Sept. 6 ; did not ripen.
 First of All, in use Sept 1 ; did not ripen.
 Extra Early White Cory, in use Sept. 6 ; did not ripen.
 Adam's Extra Early, in use Sept. 1 ; did not ripen.
 Mitchell's Extra Early, in use Sept. 6 ; did not ripen.
 White Cory, in use Sept. 1 ; did not ripen.
 Squaw, in use Aug. 20 ; ripe, Sept. 6.

Pop-corn.

White Rice ; did not ripen.
 White Pearl ; did not ripen.

CUCUMBERS.—Planted in hot-house, March 10 ; set out, May 28.

London Long Green, ripe, Sept. 5 ; very poor crop.
 Prize Pickling ; no fruit set.
 White Wonder ; no fruit set.
 New Giant Pera, ripe, Sept. 5 ; very poor crop.

CITRONS.—Sown in cold-frames in garden, May 28.

Preserving ; fruit small.
 Colorado ; fruit small.

LETTUCE.—Sown, May 28.

Cabbage Neapolitan, in use June 6 ; very fine.
 Early Ohio, in use June 6 ; good.
 Blonde Stone-head, in use June 6 ; good.
 All the Year Round, in use June 9 ; good.
 Trocadero Red Edged, in use June 9 ; good.
 Cos, Green Paris, in use July 6 ; good heads.
 Cos, Trianon, in use July 6 ; good heads.

ONIONS.—Sown in Hot-house, April 7 ; set out, May 28 ; lifted, Sept. 18 ; also sown in open, May 8.

	Bush. per acre, transplanted.	Bush. per acre, sown in open.
Large Red Wethersfield	221	120
Yellow Globe Danvers :	201	180
Market Favourite	170	180
Paris Silver-skin . . . . .	...	170

All varieties were smaller than usual but the bulbs were very fine and solid.

MELONS.

Musk.—Sown in hot-house, May 10 ; set out, May 28.
Earliest of All, no fruit matured.
Hackensack, no fruit matured.
Extra Early Netted Gem, no fruit matured.
Water.—Sown in hot-house May 10 ; set out May 28 ; Fordhook, no fruit matured ;
Early Canada, no fruit matured.

PUMPKINS.

Sown in hot-house May 10 ; set out May 28.
Sweet or Sugar, ripe, Aug. 30 ; weight, 16 lbs.; light crop.
Large Yellow or Field, ripe, Aug. 30 ; weight, 28 lbs.; light crop.

SQUASH.

Sown in hot-house May 10 ; set out May 28.
Early Vegetable Marrow, light crop set and did not mature.

TURNIPS.

Sown May 27 ; in use July 30 ; pulled October 17.
Early Stone, bushels per acre, 523 ; good.
Extra Early White Milan, bushels per acre, 490 ; coarse.
Early White Strapleaf, bushels per acre, 483 ; bad shape.
Robertson's Golden Ball, bushels per acre, 400 ; very good.

PEASE.—Sown May 14.

Variety.	In use.		Ripe.		Size.	Remarks.
Surprise.....	July	19	Aug.	9	Small	Fair cropper.
Stratagem.....	"	30	Sept.	12	Large	Good cropper ; late.
Shropshire Hero.....	"	31	Aug.	22	"	"
Alaska.....	"	25	"	22	Small	Good ; early.
American Wonder.....	"	19	Sept.	14	"	"
Anticipation	"	20	"	14	Large	Fair cropper ; late.
Admiral.....	Aug.	5	"	14	Small	" "
Burpee's Profusion.....	July	30	Aug.	9	Large	Good cropper.
Extra Early.....	"	19	"	9	Small	"
Ever-bearing.....	"	28	"	9	Medium.....	"
First of All	"	19	"	9	Small	"
First and Best.....	"	21	"	9	"	"
Laxton's Charmer....	Aug.	5	"	9	Large	" late.
Gradus.....	July	25	"	22	"	"
Champion of England.....	"	30	"	22	Medium	"
Horsford's Market Garden.....	Aug.	7	"	9	"	"
William Hurst	July	26	"	9	Small	"
Rural New Yorker.....	"	10	Sept.	14	"	Fair cropper ; early.
Prince of Wales	Aug.	5	"	14	Medium.....	Good cropper.
Premium Gem.....	July	20	Aug.	14	"	"
Yorkshire Hero..	"	31	"	9	"	"
Nott's Excelsior.....	"	19	"	9	"	"
Harrison's Glory.....	Aug.	10	Sept.	14	Small	" late.
C. P. R.	"	5	"	14	Large	" "
Queen.....	"	30	Medium.....	" "

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RADISH.

First seeding, May 8 ; in use June 7. Second seeding, June 1 ; in use June 24.
 Ne Plus Ultra ; Early Scarlet White Tipped ; French Breakfast ; Olive-shaped
 Deep Scarlet ; Early Scarlet Turnip.
 Both seedings did well. All good varieties.

PARSNIPS.

Sown May 8 ; lifted October 4.
 New Intermediate, bushels per acre, 180. Medium size.
 Elcomb's Giant, bushels per acre, 160. Small ; medium quality.
 Hollow Crown, bushels per acre, 120. Small ; medium quality.

TOMATOES.

Sown in Hot house, April 3 ; Transplanted to Cold-frame, April 30 ; Set out May 28.

	Green. — In use.	First ripe.	Remarks.
Atlantic Prize.....	July 18..	Aug. 30..	Small ; smooth.
Early Ruby.....	" 18..	" 30..	Small ; rough.
Earliest of All.....	" 21..	" 30..	Medium ; smooth.
Earliana.	" 18..	Sept. 5..	Large "
Success.....	" 24..	" 5..	Medium "
Canada.....	" 20..	" 5..	" "
Peach.....	" 30..	" 5..	Small ; rough.

PEPPERS.

Sown in hot-house, April 3 ; transplanted, April 30 ; set out May 28.
 Ruby King, did not ripen.

PARSLEY.

Sown May 28. Champion Moss-curved—Did well late in the season.
 Triple curled—Did well late in the season.

RHUBARB—OLD BEDS.

Victoria, in use May 23 ; good crop ; fine stalks.
 Linnaeus, in use May 23 ; good crop ; fine stalks.

SAGE—WINTER SAVORY.

Sown May 28 ; did fairly well.

SPINACH.

Sown May 28 ; good crop.

FLOWER GARDEN.

ANNUALS—Propagated in Hot-house. Sown March 31.

Variety.	Set out.	IN BLOOM.		Remarks.
		From	To	
Aster, 12 varieties.....	June 4..	July 27..	Sept. 22..	Very fine show.
Amarantus, 2 varieties.....	" 6..			Did not bloom.
Arabis Alpina Compacta.....	" 6..			Fine plants.
Ageratum.....	" 4..	July 11..	Sept. 10..	Good border.
Oenothera Drummondii.....	" 4..	" 26..	" 10..	Good show.
Aquilegia Chrysantha Nana.....	" 6..	" 26..	" 10..	Did well.
Antirrhinum, 3 varieties.....	" 4..	" 11..	" 10..	Some fine flowers.
Clarkia, 2 varieties.....	" 6..	" 16..	" 10..	Bloomed freely.
Chrysanthemum, 2 varieties.....	" 6..	" 15..	" 17..	Flowers small.
Calendula.....	" 6..	" 7..	" 17..	Very fine.
Centaurea.....	" 6..	" 16..	" 10..	Large and fine.
Celosia, 2 varieties.....	" 6..			Did not bloom.
Coreopsis, 3 varieties.....	" 6..	July 5..	Sept. 10..	Good show of bloom.
Dianthus, 7 varieties.....	" 4..	" 10..	" 17..	Very fine.
Dahlia, Single.....	" 4..	" 20..	" 10..	Did well.
Eschscholtzia.....	" 4..	" 20..	" 17..	Very fine.
Godetia, 3 varieties.....	" 4..	" 24..	" 10..	Good show of bloom.
Gaillardia, 2 varieties.....	" 4..	" 8..	" 17..	Did well.
Gypsophila Elegans.....	" 4..	Aug. 4..	" 10..	"
Helianthus.....	" 4..	" 4..	" 10..	"
Helichrysum, 2 varieties.....	" 4..	July 2..	" 10..	"
Hollyhock.....	" 4..	" 2..	" 10..	"
Iberis Gibraltica.....	" 4..			Did not bloom.
Lychnis Haageana.....	" 8..	July 8..	Sept. 10..	Did fairly well.
Lobelia.....	" 8..	" 8..	" 10..	Did well.
Larkspur.....	" 8..	" 10..	" 10..	"
Linum.....	" 8..	" 10..	" 10..	"
Lupinus.....	" 8..	Aug. 8..	" 17..	"
Mignonette.....	" 4..	July 12..	" 10..	"
Marigold.....	" 4..	" 16..	" 10..	Made fine show.
Nasturtium, 2 varieties.....	" 4..	" 20..	" 10..	Very fine.
Nigella.....	" 4..	" 24..	" 10..	Very pretty.
Nicotina.....	" 4..	" 26..	" 10..	Large and fine.
Sweet Alyssum.....	" 6..			Did not bloom.
Stocks, 2 varieties.....	" 6..	July 15..	Sept. 17..	Very fine show.
Salpiglossis, 2 varieties.....	" 6..	Aug. 5..	" 10..	Did well.
Verbena.....	" 4..	July 26..	" 10..	Very fine.
Scabiosa, 2 varieties.....	" 6..	" 28..	" 10..	Good show of bloom.
Petunia.....	" 30..	" 8..	" 17..	Large fine bloom.
Phlox, 5 varieties.....	" 4..	" 4..	" 17..	Very fine show.
Portulaca.....	" 4..	" 4..	" 17..	Did well.
Poppies, 3 varieties.....	" 4..	" 22..	" 10..	Very fine.
Zinnia, 3 varieties.....	" 4..	" 23..	" 10..	Good.

ANNUALS—SOWN IN THE OPEN.

The following Annuals were sown in the open from May 17 to May 27. All did well and bloomed freely, but were about two weeks later than the same varieties sown in the hot-house and transplanted.

Amarantus.
Ageratum
Antirrhinum.
Aster.
Agrostemma.
Candytuft.
Centaurea.
Chrysanthemum.

Godetia.
Helichrysum.
Iberis Gibraltica.
Mignonette.
Marigold.
Nigella.
Phlox.
Poppies.

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Calendula.
Coreopsis.
Dianthus.
Celosia.
Eschscholtzia.
Gaillardia.

Petunias.
Scabiosa.
Salpiglossis.
Sweet Alyssum.
Sweet Peas, 25 varieties.
Zinnia.

PERENNIALS.

The old beds of Perennials, including Pansies, Larkspur, Sweet William, Columbine, Lychnis and Everlasting Pea, came through the winter in good condition and flowered well during the season.

BULBS.

Gladioli—3 varieties. Set out June 4. In flower August 1 to Sept. 10. Very fine.

Dahlia.—Set out June 4. In flower July 16. Flowers large and fine but about two weeks later than usual.

Tulips.—In bloom May 15. Very fine showing. Flowers large and regular.

Cannas.—In bloom July 20. Later than usual, but the flowers were very fine.

Iris.—Planted in 1900. Maintained a good succession of bloom from June 5 to July 25.

PÆONIES.

Planted in 1900. Magnificent flowers.

OTHER PERENNIALS.

Planted 1900. The majority of a large list, including Achillea, Aster, Clematis, Centaurea, Funkia, Geranium, Hemerocallis, Helianthus, Lysimachia, Rudbeckia, Thermopsis and Veronica, came through the winter in good condition and flowered freely. The plot was an attractive one during the whole season.

TREES AND SHRUBS.

The trees and shrubs on the farm made satisfactory progress during the season. The winter of 1901–2 was very favourable, and nearly all the specimens living in the fall of 1901 were found to be in good condition this spring.

Growth started somewhat later than usual, but the large amount of moisture in the early part of the season more than made up for the loss of time.

A large number of the shrubs fruited this season, and as the seed was carefully collected, it is hoped that a good variety of home-grown seedlings will soon be available for distribution. The crop of maple seed on the farm was again practically destroyed by the fungus which ruined the crop last year, but the trees in the Qu'Appelle valley, north of Indian Head, were free from disease, and a quantity of seed sufficient for the distribution of 1903 has been secured from there.

The Evergreen trees made good progress during the season, the growth of White Spruce, Rocky Mountain Spruce, Scotch Pine and Mountain Pine being particularly noticeable.

ARBORETUM.

Forty-five species and varieties of trees and shrubs were added to the Arboretum last spring. The specimens had been grown one year in nursery rows in a sheltered position on the farm, and the weather being favourable at the time of transplanting, the moving caused very little set-back.

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The clump of *Syringa Vulgaris*, numbering 23 varieties, is growing well, and in another year or two will, no doubt, be very attractive.

Appended is a short list of the varieties of trees and shrubs that have proved conspicuously successful in the past few years :

Botanical name—	Common name—
<i>Acer Negundo</i> .	Box Elder.
<i>Acer Tataricum Ginnala</i> .	Giunalian Maple.
<i>Alnus Glutinosa</i> .	Common Alder.
<i>Betula Populifolia</i> .	White Birch.
<i>Caragana Arborescens</i> .	Siberian Pea Tree.
<i>Cornus Stolonifera</i> .	Red Osier Dogwood.
<i>Cotoneaster Integerrima</i> .	Common Cotoneaster.
<i>Crataegus Chlorosarca</i> .	
" <i>Coccinea</i> .	Scarlet Haw.
" <i>Crus Galli</i> .	Cockspur Thorn.
<i>Fraxinus Americana</i> .	White Ash.
" <i>Pennsylvanica Lanceolata</i> .	Green Ash.
<i>Lonicera Alberti</i> .	Albert Regel's Honeysuckle.
" <i>Tatarica</i> .	Tartarian Honeysuckle.
<i>Populus Balsamifera</i> .	Balsam Poplar.
" <i>Deltoidea</i> .	Cottonwood.
<i>Rhamnus Cathartica</i> .	Common Buckthorn.
" <i>Frangula</i> .	Breaking Buckthorn.
<i>Ribes Aureum</i> .	Missouri Currant.
" <i>Sibirica</i> .	Siberian Currant.
<i>Salix Pentrandia</i> .	Laurel Leaved Willow.
" <i>Purpurea Pendula</i> .	Pendulous Purple Willow.
" <i>Voronesh</i> .	Voronesh Willow.
<i>Syringa Chinense</i> .	Rouen Lilac.
" <i>Josikea</i> .	Josika's Lilac.
" <i>Vulgaris</i> .	Common Lilac.
<i>Ulmus Americana</i> .	American Elm.
<i>Viburnum Opulus</i> .	Highbush Cranberry.

FRUIT TREES AND BUSHES.

The crop of fruits, with the exception of crab apples, currants and raspberries, was most disappointing. The native and American plums set a heavy crop of fruit, which was immediately affected with plum-pocket, and any plums that escaped injury from this cause were frozen before they came to maturity. The trees blossomed somewhat later than last year, and the growth of fruit was retarded by the cool wet weather in the early part of the season. The crab apples (*Pyrus Baccata* and *Pyrus Prunifolia*) fruited freely and ripened before the frost on September 12. Currants were a fair crop of excellent quality. Raspberries were above the average, and the fruit of nearly all the varieties was of exceptional quality. Very little fruit set on the gooseberries. Strawberries were, as usual, almost a total failure.

SEEDLING APPLES.

The two seedlings each of Tonka and Arctic, planted in 1899, came through the winter in good condition, but did not blossom. The Wealthy, Blushed Calville and Hiberna, planted in 1900, were unfortunately nearly all destroyed by rabbits during the winter. Any trees that were not barked made strong growth during the season.

GRAFTING.

The grafting of scions of hardy apples and crab apples grown in Manitoba, commenced in 1901, was continued this spring, and scions of the more promising varieties of American seedling plums were grafted on some of the trees of the Manitoba native plums which have proved inferior in size and quality.

Seventy-five per cent of the grafts on crab apples which struck in 1901 came through the winter in good condition and grew well during the season.

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PLANTING.

In the orchard laid out in 1901 the following seedlings of hybrid crab apples were planted this year :—

36 seedlings of Novelty,	14 seedlings of Charles,
18 " Progress,	8 " Belmont,
18 " Prairie Gem,	9 " Eastman,
36 " Aurora,	11 " Eaton.
4 " Belmont,	

FRUIT CROP.

Pyrus.

INDIAN HEAD SEEDLINGS.

Pyrus Baccata Genuina, *Pyrus Baccata Cerasiformus*, *Pyrus Baccata Macrocarpa*, *Pyrus Baccata Sanguinea* and *Pyrus Prunifolia*, bore heavy crops of fruit, nearly all of which ripened before the frost on September 12. The fruit generally was small, but one of the trees of *Pyrus Baccata Macrocarpa* produced the largest crabs that have, so far, been grown on the farm.

SEEDLINGS RECEIVED FROM THE CENTRAL EXPERIMENTAL FARM.

Pyrus Baccata Sanguinea, *Pyrus Baccata Aurantiaca*, *Pyrus Baccata Macrocarpa*, *Pyrus Baccata Cerasiformus*, *Pyrus Baccata Genuina* and *Pyrus Prunifolia intermedia* fruited, and the average size, though small, was considerably larger than last year's crop.

PLUMS.

The trees were badly injured by a heavy snow storm on September 23, 1901, some of the best trees being entirely ruined.

All varieties came safely through the winter and made strong growth during the season.

Seedlings of Hungarian Plum—Planted 1894.—Heavy crop of fruit set, but was frozen long before it came to maturity.

Seedlings of Speer—Planted 1895.—Fruited lightly, but were caught by frost.

Seedlings of Weaver—Planted 1894.—Wintered well and set a heavy crop of fruit. Fruit destroyed by frost.

Seedlings of De Soto—Planted 1895.

Seedlings of Rollington—Planted 1897.—Medium crop of fruit set, but did not ripen in time to escape frost.

Aikin Plum—Planted 1897.—Wintered well, but set a very light crop. The fruit was further advanced when frost came than any of the native or seedling varieties, but was not fit for use.

MANITOBA NATIVE PLUMS.

The trees generally wintered in good condition, and set a heavy crop of fruit. Struck by plum-pocket, which destroyed 50 per cent of the fruit and the balance was frozen.

American Seedling Plum trees, received from Chas. Luedloff, Cologne, Minnesota. Wintered well and fruited heavily. Crop destroyed by plum-pocket and frost.

CHERRIES.

Seedling of Carnation—Planted 1896.—Wintered well, but did not fruit.

Seedling of Lithaur Weichsel—Planted 1894.—Wintered in good condition, but no fruit set.

Seedling of Olivet—Planted 1895.—The only surviving tree wintered well and made a strong healthy growth, but did not fruit.

Mahaleb—Planted 1895.—Wintered well. Made strong growth. Blossomed, but no fruit set.

Seedling of Wild Cherry from Nebraska. —Fruited lightly. Fruit small and of poor quality.

Rocky Mountain Cherry—Planted 1895.—Fruited heavily. Fruit small and much too late.

FRUNNUS PUMILA,

Hardy. Very light crop. Small. Poor quality.

SMALL FRUITS.

WHITE CURRANTS.

White Grape, White Dutch, White Imperial and White Transparent were under test. All were hardy, made strong growth and produced excellent crops of very fine fruit.

RED CURRANTS.

Fay's Prolific, Raby Castle, Red Dutch, La Conde, Knight's Early Red, New Red Dutch, Native Red, London Red, Victoria, Fertile d'Angers, Cherry, Prince Albert, La Fertile, Versailles, North Star, Pomona, and Wilder under test. Came through the winter in good condition. A large crop of fruit set and ripened evenly. Quality, exceptionally good.

BLACK CURRANTS.

Lee's Prolific, Black Naples, Prince of Wales, Crandall, and the following of Saunders' Seedlings, Stewart, Orton, Clipper, Kerry, Eagle, Monarch, Charmer, Beauty, Winona, Ontario, Standard, Lewis, Ethel, Stirling, Star, Madoc, Perry, Eclipse, Oxford, Climax, all wintered in good condition and made strong growth. A very light crop of fruit set.

RASPBERRIES.

Dr. Reider, Philadelphia, Turner, Caroline, Lady Anne, Garfield, Miller's Red and Kenyon came out of winter covering in good condition and blossomed very freely. The crop was much above the average in quantity and quality.

GOOSEBERRIES.

Smith's Improved, Lancashire Lad, Governess, Columbus, Houghton, Native, Pearl, and Keepsake under test. All hardy. Fruited very lightly. Made strong growth.

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STRAWBERRIES.

Captain Jack, New Dominion, Windsor Chief and Pineapple under test. Crop a failure.

SUMMER-FALLOWS.

It is very gratifying to know that throughout the Territories, summer-fallowing is rapidly becoming general. No matter where farming is carried on, the farmers realize that to be sure of a crop they must prepare a portion of their land the year before the crop is grown, and apart from the value of the stored moisture, there is the inestimable advantage of keeping weeds from over-running the farm.

The true worth of properly prepared fallows has been clearly demonstrated in past years in every grain-growing district of Assiniboia.

The work of preparing land for crop by fallowing is carried on in so many ways in different parts of the Territories, that perhaps a few words on some of the methods employed may be of help to at least some of the new settlers.

It has been observed in Alberta and Saskatchewan that the land to be fallowed is not, as a rule, touched until the weeds are full-grown and in many cases, bearing fully matured seed. It is then ploughed.

By this method, which, no doubt, saves work at the time, the very object of a summer-fallow is defeated. In the first place, moisture is not conserved because the land has been pumped dry by the heavy growth of weeds; and, secondly, instead of using the summer-fallow as a means of eradicating weeds, a foundation is laid for years of labour and expense by the myriads of foul seeds turned under.

The endless fields of yellow-flowered weeds, generally Ball Mustard (*Neslia paniculata*), testify to the indifferent work done in many districts, and while no weed is more easily eradicated by a good system of fallows, there is no weed that is more easily propagated or takes greater advantage of poor work on fallows or of fall or spring cultivation.

As has been pointed out in my previous reports, early and thorough work on fallows is absolutely necessary to success, and I here repeat the methods and results of tests carried on for some years past.

First Method.—Ploughed deep (6 to 8 inches) before last of June; surface cultivated during the growing season, and just before or immediately after harvest ploughed 5 or 6 inches deep.

Result.—Too much late growth if season was at all wet; grain late in ripening, and a large crop of weeds if the grain was in any way injured by winds.

Second Method.—Ploughed shallow (3 inches deep) before the last of June; surface cultivated during the growing season, and ploughed shallow (3 to 4 inches deep) in the autumn.

Result.—Poor crop in a dry year; medium crop in a wet year. Not sufficiently stirred to enable soil to retain the moisture.

Third Method.—Ploughed shallow (3 inches) before the last of June; surface cultivated during the growing season, and ploughed deep (7 to 8 inches) in the autumn.

Result.—Soil too loose and does not retain moisture. Crop light and weedy in a dry year.

Fourth Method.—Ploughed deep (7 to 8 inches) before the last of June; surface cultivated during the growing season.

Result.—Sufficient moisture conserved for a dry year, and not too much for a wet one. Few or no weeds, as all the seeds near the surface have germinated and been killed. Surface soil apt to blow more readily than when either of the other methods is followed. For the past fourteen years, the best, safest and cleanest grain has been grown on fallow worked in this way, and the method is therefore recommended.

Fallows that have been ploughed for the first time after the first of July, and especially after July 15, have never given good results; and the plan too frequently followed of waiting till weeds are full grown, and often ripe, and ploughing under with the idea of enriching the soil, is a method that cannot be too earnestly advised against.

In the first place, after the rains are over in June or early in July, as they usually are, no amount of work, whether deep or shallow ploughing, or surface cultivation, can put moisture in the soil. The rain must fall on the first ploughing and be conserved by surface cultivation.

Weeds, when allowed to attain their full growth, take from the soil all the moisture put there by the June rains, and ploughing under weeds with their seeds ripe or nearly so, is adding a thousand-fold to the myriads already in the soil, and does not materially enrich the land.

BREAKING AND BACK-SETTING.

In view of the fact that every year brings to the Territories, many new settlers, who are unacquainted with the methods of breaking up and preparing new land for crop, a few suggestions with regard to this very important work may not be amiss.

In all sections where the sod is thick and tough, breaking and back-setting should be done; while in districts where scrub abounds and the sod is thin, deep breaking is all that is necessary.

The former is generally applicable to Assiniboia, and the latter to Alberta and Saskatchewan, especially to the northern parts of these Territories where the land is more or less scrubby.

SHALLOW BREAKING.

(To be back-set).

The sod should be turned over as thin as possible, and for this purpose a walking plough with a 12 or 14 inch share, is the best. When the breaking is completed (which should not be later than the second week in July), rolling will hasten the rotting process and permit back-setting to commence early in August.

BACK-SETTING.

Back-setting is merely turning the sod back to its original place, and at the same time bringing up two or three inches of fresh soil to cover it. The ploughing should be done in the same direction as the breaking and the same width of furrow turned. Two inches below the breaking is considered deep enough but three or four inches will give better results.

After back-setting, the soil cannot be made too fine and the use of disc or Randall harrow to cut up every piece of unrotted sod, will complete the work.

DEEP BREAKING.

Deep breaking, which in many sections of the country is the only practicable way of preparing new land, and which is, unfortunately, done in some instances where breaking and back-setting would give more satisfactory results, consists in the turning over of the sod as deep as possible; usually from 4 to 5 inches.

When the sod has rotted, the top-soil should be worked and made as fine as possible. The use of harrow or disc will fill up all irregularities on the surface, and make a fine, even seed bed.

Whether the land is broken shallow or deep, it is necessary to have the work completed early, so as to take advantage of the rains which usually come during June or

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early in July. These rains cause the sod to rot, and without them or if the ploughing is done after they are over, the sod remains in the same condition as when turned, and no amount of work will make up for the loss.

To some districts near the foot-hills of the mountains and in districts where scrub abounds, and the sod is thin, these remarks may not apply, but, as a rule, throughout the Territories, early breaking, whether deep or shallow is advisable.

WORKING LAND AFTER FIRST CROP.

Inquiries are often made as to what should be done after taking off the first crop on new land, the question being as to whether the land should be ploughed, or cultivated, or sown without any cultivation whatever.

This, however, can only be determined by circumstances. In districts with heavy clay soil, a satisfactory crop may be expected from burning the stubble of the former crop and sowing with or without cultivation; although a shallow cultivation after the stubble is burnt usually gives the best results.

In districts with light soils and especially with gravelly subsoil, cultivation before seeding is necessary.

After taking the second crop from breaking or back-setting, there can be no doubt that the land should be well fallowed to put it in proper condition for succeeding crops. If the fallow is well made and the process is repeated every third year, the settler will have started on the right road to future success.

CATTLE.

The herd on the farm at present consists of 15 short-horn females and 2 males, and 1 male each of the Guernsey and Ayrshire breeds. There are also 17 grades.

During the past year 4 short-horn males have been sold to farmers or ranchers in the Territories for breeding purposes.

FEEDING TEST.

Fifteen 3-year old steers were purchased from ranchers on November 20, 1901, and fed for 48 days on a uniform ration preparatory to a 16 weeks' comparative test of Brome hay, Western rye grass and cut straw as fodders.

From November 20 to December 10, each animal received per day—18 lbs. cut straw (wheat), 16 lbs. ensilage (corn), 4 lbs. meal (1 part wheat to 3 parts barley).

On December 10, the 15 head were divided into three lots of approximately equal weight and fed for 28 days on a uniform ration consisting of 14 lbs. cut straw, 16 lbs. ensilage, 5 lbs. meal, 12 lbs. mangels.

The test commenced on January 9, 1902, and the three lots were fed as follows:—4 weeks, January 9 to February 6. Each animal per day.

Lot No. 1.—Fourteen lbs. Western rye grass hay, 16 lbs. ensilage, 6 lbs. meal, $\frac{1}{4}$ lb. ground linseed.

Lot No. 2.—Fourteen lbs. cut straw, 16 lbs. ensilage, 6 lbs. meal, $\frac{1}{4}$ lb. ground linseed.

Lot. No. 3.—Fourteen lbs. Brome-grass hay, 16 lbs. ensilage, 6 lbs. meal, $\frac{1}{4}$ lb. ground linseed.

Four weeks, February 7 to March 5, same ration, with the exception of meal, which was increased to 8 lbs. daily.

Four weeks, March 6 to April 2, same ration, with the exception of meal, which was increased to 10 lbs. daily.

Four weeks, April 3 to April 30, same ration, with the exception of meal, which was increased to 12 lbs. daily, and linseed increased to $\frac{1}{2}$ lb. daily.

From the completion of the test until the steers were sold on May 9 (nine days), the same ration was fed as during the last four weeks of the test.

The steers were fed three times daily and watered twice, and were sold for export on May 9.

Following will be found a statement of the monthly and total weights and gains of each lot of steers during the period of test; weights and gains made by the total number during the whole period (November 20 to May 9); the total amount and estimated value of the feed consumed during the same time; and a summary of the financial results of the transaction.

MONTHLY and total weights and gains of each lot of steers during the period of test.

Lot.	Weight at start of test.	1st 4 weeks.		2nd 4 weeks.		3rd 4 weeks.		4th 4 weeks.		Total Gain.
		Weight.	Gain.	Weight.	Gain.	Weight.	Gain.	Weight.	Gain.	
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Lot No. 1.....	5,630	5,810	180	6,050	240	6,180	130	6,460	280	830
Lot No. 2.....	5,690	6,000	310	6,190	190	6,570	380	6,730	160	1,040
Lot No. 3.....	5,660	5,860	200	6,070	210	6,370	300	6,570	200	910

TOTAL weight and gain made during the whole period, November 20 to May 9.

Lot.	Weight when Bought, November 20.	Weight when Sold, May 9.	Gain.
	Lbs.	Lbs.	Lbs.
Lot No. 1	5,463	6,610	1,147
Lot No. 2	5,473	6,890	1,417
Lot No. 3	5,454	6,660	1,206
	16,390	*20,160	3,770

*Sold less 5 per cent shrinkage, leaving net weight 19,152 lbs.

TOTAL weight and estimated value of the feed consumed during the whole period, Nov. 20 to May 9. Preparatory feeding, each lot (5 steers), 48 days.

Cut Straw—

18 lbs. per day for 20 days = 1,800 lbs. }
14 " " 28 " = 1,960 " } = 3,760 lbs. at \$1 per ton\$ 1 88

Ensilage—

16 lbs. per day = 3,840 lbs. at \$2 per ton 3 84

Meal—

4 lbs. per day for 20 days = 400 lbs. }
5 " " 28 " = 700 " } = 1,100 lbs. at $\frac{2}{3}$ c..... 7 33

Mangels—

12 lbs. per day for 28 days = 1,480 lbs. at 10c. per bushel..... 2 46

Or for the three lots, \$46.53. \$ 15 51

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DURING TEST (112 days).

Lot No. 1.

Western Rye Grass, 7,840 lbs. at \$5 per ton	\$ 19 60
Ensilage, 8,960 lbs. at \$2 per ton	8 96
Meal, 5,040 lbs. at $\frac{2}{3}$ c. per lb.	33 60
Ground Linseed, 175 lbs. at 2c. per lb.	3 50
	<hr/>
	\$65 66

Lot No. 2.

Cut Straw, 7,840 lbs. at \$1 per ton	\$ 3 92
Ensilage, 8,960 lbs. at \$2 per ton	8 96
Meal, 5,040 lbs. at $\frac{2}{3}$ c. per lb.	33 60
Ground Linseed, 175 lbs. at 2c. per lb.	3 50
	<hr/>
	\$49 98

Lot No. 3.

Brome Hay, 7,840 lbs. at \$5.00 per ton	\$19 60
Ensilage, 8,960 lbs. at \$2.00 per ton	8 96
Meal, 5,040 lbs at $\frac{2}{3}$ c. per lb.	33 60
Ground Linseed, 175 lbs. at 2c. per lb.	3 50
	<hr/>
	\$65 66

FROM END OF TEST TO DATE OF SALE (9 days).

Lot No. 1.

Western Rye Grass, 630 lbs. at \$5.00 per ton	\$1 57
Ensilage, 720 lbs. at \$2.00 per ton	72
Meal, 540 lbs. at $\frac{2}{3}$ c. per lb.	3 60
Ground Linseed, 22 $\frac{1}{2}$ lbs. at 2c. per lb.	45
	<hr/>
	\$6 34

Lot No. 2.

Cut-straw, 630 lbs. at \$1.00 per ton	\$ 32
Ensilage, 720 lbs. at \$2.00 per ton	72
Meal, 540 lbs. at $\frac{2}{3}$ c. per lb.	3 60
Ground Linseed, 22 $\frac{1}{2}$ lbs. at 2c. per lb.	45
	<hr/>
	\$5 09

Lot No. 3.

Brome Hay, 630 lbs. at \$5.00 per ton	\$1 57
Ensilage, 720 lbs. at \$2.00 per ton	72
Meal, 540 lbs. at $\frac{2}{3}$ c. per lb.	3 60
Ground Linseed, 22 $\frac{1}{2}$ lbs. at 2c. per lb.	45
	<hr/>
	\$6 34

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SUMMARY OF COST OF FEEDING.

Lot No. 1.

Preparatory.....	\$15 51
During test.....	65 66
From end of test till sold.....	6 34
	<hr/>
	\$87 51
	<hr/>

Lot No. 2.

Preparatory.....	\$15 51
During test.....	49 98
From end of test till sold.....	5 09
	<hr/>
	\$70 58
	<hr/>

Lot No. 3.

Preparatory.....	\$15 51
During test.....	65 66
From end of test till sold.....	6 34
	<hr/>
	\$87 51
	<hr/>

SUMMARY of the Financial results of the Transaction.

Lot No.	Weight bought.	At	Amount paid.	Add Cost of Feed.	Total Cost.	Weight sold.	At	Amount received.	Gain on each Lot	Gain per Head.
	Lbs.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	Lbs.	cts.	\$ cts.	\$ cts.	\$ cts.
No. 1.....	5,463	3 11 ³ / ₄	170 35	87 51	257 86	6,280	5	314 00	56 14	11 23
No. 2.....	5,473	3 11 ³ / ₄	170 66	70 58	241 24	6,546	5	327 30	86 06	17 21
No. 3.....	5,454	3 11 ³ / ₄	170 06	87 51	257 57	6,326	5	316 30	58 73	11 74
	16,390	.. ..	511 07	245 60	756 57	19,152	.. ..	957 60	200 93	*

* Or an average net gain of \$13.39 per head.

SWINE.

Three breeds, Tamworth, Berkshire and Yorkshire White are kept on the farm. Since last report, 8 Berkshire boars and 6 sows; 3 Tamworth boars and 9 sows, and 1 Yorkshire White boar, have been sold to farmers for breeding purposes.

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POULTRY.

There are at present, three breeds kept, viz., Light Brahmas, White Wyandottes and Black Minorcas. The Light Brahmas were received last spring from the Experimental Farm at Brandon, Man., and have done well.

HORSES.

No change has taken place in the working force since my last report, and the health of the horses has been uniformly good throughout the year.

EXHIBITIONS.

An exhibit of the products of the farm was made at the Central Assiniboia Agricultural Society's Exhibition at Indian Head; and samples of fruits and vegetables were taken to the Western Horticultural Society's Exhibition in Winnipeg.

A large collection of grain in straw and threshed grain was shipped to Japan for the use of the Exhibition Department of Canada, at the exhibition to be held at Osaka, Japan, in 1903. An exhibit for the St. Louis, Mo., World's Fair, in 1904, is now in preparation.

DISTRIBUTION OF SAMPLES.

During the months of March April and May, the following distribution of samples of the products of the farm was made to applicants throughout the territories of Alberta, Assiniboia and Saskatchewan.

GRAIN.

Wheat.....	265	bags, 3 lbs. each.
Oats.....	380	"
Barley.....	264	"
Peas.....	230	"
Sundries.....	111	"
Potatoes.....	725	"
Tree seeds. Maple..	756	" 1 lb. each.
Ash.....	520	"
Grass seed. Brome.	659	"
Western Rye.....	400	"
Small seeds.....	464	packages, containing 5,568 pkts. shrub-seed, flower-seed, root-seeds, garden-seeds and corn.
Fruit bushes.	163	packages.
Tree and shrub seedlings.....	452	"
Rhubarb.....	51	"

CORRESPONDENCE.

During the 12 months ending October 31, 1902, 5,210 letters were received, and 5,357 mailed from this office. In letters received, circular reports on grain and other samples, are not counted; and in letters mailed, circulars of instruction sent with grain and other samples are not included.

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METEOROLOGICAL.

Month.	Temperature. Maximum.		Temperature. Minimum.		Snow- fall.	Rain-fall.		Hours of Sunshine.
	Date.	Degrees	Date.	Degrees	Inches.	No. of days.	Inches.	
1901.								
November.....	28	52	4	—4	.....	.....	.....	81.2
December.....	29	43	14	—34	5	.....	.....	56—
1902.								
January.....	6	40	26	—35	.....	.....	.....	106.8
February.....	20	39	4	—30	14	.....	.....	74.2
March.....	23	40	17	—24	9	2	.45	77.2
April.....	30	67	1	5	8	1	.07	174.9
May.....	28	83	9	27	3	7	3.57	191.
June.....	8	79	4	34	.....	8	4.96	167.6
July.....	22	87	7	36	.....	1	.67	248.
August.....	15	90	30	35	.....	2	.59	258.
September.....	23	77	30	21	.....	2	.42	143.3
October.....	4	76	20	10	.....	.....	.....	138.4
					39	23	10.73	1,716.6

I have the honour to be, sir,

Your obedient servant,

ANGUS MACKAY,

Superintendent.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA.

REPORT OF THOMAS A. SHARPE, SUPERINTENDENT.

AGASSIZ, B.C., November 30, 1902.

To Dr. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to present my report of the work done and progress made on the Experimental Farm at Agassiz, B.C., for the year 1902. The season has been a favourable one and crops of all sorts have been good and the weather suitable for securing them in good condition. The winter was mild, the lowest temperature registered being five above zero, and that only for one day. February and March were very mild and the snowfall for the whole winter very light. The spring was not so favourable, being cold and wet up to the last of May when it became warmer, when growth was more rapid and the haying season was favourable. Fine bright weather with occasional showers continued through August and September which was excellent for harvest as well as favourable to a rapid growth in corn and root crops. October was mild with an average rainfall and November, in addition to a heavy rainfall, gave us early in the month the heaviest snowfall at any one time for several years, which however soon melted away.

FRUIT CROP.

The fruit crop especially that of the larger fruits has been fairly good and the bright autumn ripened the fruit well.

HEDGES.

The sample hedges continue to make a fine growth and are one of the most attractive features on the farm.

FOREST AND TIMBER PLANTATIONS.

The forest trees planted in the shelter belt continue to make a vigorous growth. The photograph shown in this report shows a portion of the forest belt. The land having been seeded to clover some years since costs nothing to keep it clean, the trees being able to take care of themselves.

ORNAMENTAL TREES AND SHRUBS.

These continue to thrive vigorously and bloom profusely and are very much admired. Their vigorous growth and handsome appearance has induced many people to plant such shrubs and trees in many places.

NUT TREES.

The heart shaped walnut and Spanish and Japanese nut trees gave a full crop this year, and the English and American walnuts gave a few nuts each. The butternut, hardshell hickory and pecan trees have grown vigorously but have not yet fruited. The accompanying photograph shows some of the Japan walnut and hickory trees in this plantation.

DITCHING.

The deep cuts spoken of in my last report as having to be boxed are in some places completed and the land levelled up and ploughed. More of this work will be done as opportunity offers and the ditches extended.

CLEARING.

About 8 acres of the land cleared last year have been ploughed and if the winter is favourable about 15 acres more will be broken and got in order for a crop before next spring. An additional 10 acres have been cleared of brush and timber.

LIVE STOCK.

Since my last report, 4 shorthorn cows, a grade cow and a young bull have been sold, also 1 grade steer sold for beef. The stock now on hand are all pure bred except one grade steer. Seven pure bred cows, 1 bull, 3 heifer calves and 4 bull calves constitute the herd at present.

SHEEP.

Since my last report several young rams have been sold as breeders and a fine ram has been added to our flock to succeed the one imported last year. Eleven ewes, 2 stud rams and 2 ram lambs constitute the stock of Dorset horned sheep at present (see photograph).

PIGS.

The stock consists of 1 Berkshire boar, 1 sow and 5 small pigs, also one Tamworth sow and a large Yorkshire boar recently received from the Central Experimental Farm at Ottawa.

HORSES.

The horses having been in service since 1889, are now getting old, and as the area of land under cultivation has become rather large, much of it being in orchard and on that account requiring cultivation, it was thought necessary to increase the number somewhat, especially as one of the heaviest horses had become so helpless in his legs that he was unable to work and had to be destroyed. A very good team of young horses has been secured which promise to be very useful.

BEEES.

The 4 swarms carried into winter last season have increased to 7 strong swarms this year. These are well supplied with honey to carry them through the winter.

FOWLS.

There are at present 5 breeds of poultry here. Light Brahmas, White Wyandottes, Silver-laced Wyandottes, Black Minorcas and Barred Plymouth Rocks. The Rocks are perhaps the most generally useful of those, which have been tested. The incubator was only run twice last season and out of 182 fertile eggs, 120 strong healthy chicks hatched. The Plymouth rocks are the hardiest and healthiest chicks and grow rapidly. The Minorcas are healthy, but as they feather very quickly they are a little tender until they are about half grown. The Rocks and Minorcas are very satisfactory layers.

EXPERIMENTS WITH OATS.

Sixty-four varieties of oats were under trial in 1902. They were all sown on April 21, on plots of one-fortieth of an acre each at the rate of $2\frac{1}{2}$ bushels per acre. The soil was a sandy loam which has not yet been entirely cleared of the roots of the bracken or fern which is so troublesome as a weed in this country. The fern stalks were heavy and juicy and as they could not be separated from the straw in harvesting the weight of the straw which was thus very much increased, is not given, as it would be misleading. The yield of grain has been very satisfactory and there was no rust or smut on any of the plots.

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OATS.—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Character of Straw.	Length of Straw.		Kind of Head.	Yield per Acre.		Weight per Bushel.
				In.	In.		Bush.	Lbs.	
Golden Giant	Aug. 13..	114	Stiff	44	8	Sided.....	77	22	35½
Waverley.....	" 14..	115	"	46	10	Branching..	75	30	36
Hazlett's Seizure	" 13..	114	Medium..	40	8	"	74	4	36½
Golden Tartarian.....	" 15..	116	Stiff	42	12	Sided... ..	73	18	36
Tartar King.....	" 9..	110	"	46	10	Branching..	72	32	35
Columbus.....	" 12..	113	"	43	9	"	72	32	35½
Black Beauty	" 8..	109	"	48	11	"	72	22	36½
Master.....	" 13..	114	"	40	10	"	72	12	35½
Holland.....	" 12..	113	"	50	10	"	72	2	34½
Danish Island.....	" 12..	113	"	46	10	"	71	16	34
Early Gothland	" 14..	115	"	38	10	"	71	6	35
Banner.....	" 13..	114	"	44	11	"	70	30	35½
Pioneer.....	" 9..	110	Medium..	40	10	"	70	20	34
Early Maine.....	" 11..	112	Stiff	42	10	"	70		35
Lincoln.....	" 11..	112	"	50	10	"	69	14	35
Oxford.....	" 9..	110	Medium..	40	10	"	69	14	36
Cream Egyptian.....	" 14..	115	Stiff	44	10	"	68	28	34
Golden Beauty.....	" 14..	115	Medium..	50	10	"	67	6	34
White Schonen	" 11..	112	Stiff	42	9	"	66	20	34½
Kendal	" 11..	112	Medium..	40	9	Sided.....	66	10	34
California Prolific Black.....	" 12..	113	"	48	9	"	66	10	35
Improved Ligowo	" 12..	113	Stiff	48	10	Branching..	65	30	35
Goldfinder	" 14..	115	"	42	10	Sided.....	65	10	34½
Bonanza.....	" 12..	113	"	44	10	Branching..	65		34
Rosedale.....	" 13..	114	Medium..	42	8	Sided... ..	65		34½
New Zealand.....	" 22..	123	"	42	9	"	64	24	34
Joanette.....	" 19..	120	"	40	10	Branching..	64	24	34½
Siberian	" 15..	116	"	42	10	"	64	4	35
Black Tartarian.....	" 11..	112	"	48	10	Sided.....	63	28	34
Buckbee's Illinois	" 13..	114	Stiff	42	10	Branching..	63	18	34½
Brandon.....	" 12..	113	"	38	9	Sided.....	62	32	34
American Beauty.....	" 15..	116	"	44	11	Branching..	62	22	34
Mennonite.....	" 9..	110	Medium..	42	10	"	62	12	34
Early Archangel	" 12..	113	"	42	10	"	62	12	34
Early Blossom.....	" 12..	113	Stiff	42	10	Sided.....	62	12	35
Twentieth Century.....	" 11..	112	Medium..	44	11	Branching..	61	26	34½
Abyssinia.....	" 12..	113	Stiff	43	10	"	61	26	35
White Giant	" 12..	113	"	44	8	Sided.....	61	16	34
Holstein Prolific.....	" 11..	112	"	40	9	Branching..	61	16	35
Milford.....	" 12..	113	Medium..	34	8	Sided.....	61	6	34
Newmarket.....	" 15..	116	"	38	8	Branching..	60	30	34
Scotch Potato.....	" 14..	115	Stiff	40	10	"	60	30	35
Abundance.....	" 14..	115	Medium..	42	9	"	60	10	34½
Early Golden Prolific.....	" 14..	115	"	38	9	"	60	10	33
Flying Scotchman.....	" 9..	110	Stiff	42	10	"	59	14	34½
Thousand Dollar.....	" 12..	113	"	44	10	"	59	14	34
Cromwell.....	" 14..	115	"	42	9	"	59	4	34
Miller	" 11..	112	Weak	38	8	"	59	4	33
Black Mesdag.....	" 8..	109	Medium..	48	10	"	58	28	34
Oderbruck	" 14..	115	Stiff	42	11	Sided.	58	18	34
White Russian.....	" 12..	113	"	43	10	Branching..	58	18	34½
King	" 12..	113	Medium..	40	10	"	57	32	34½
Olive	" 12..	113	Stiff	42	8	Sided.	57	22	34
Bavarian.....	" 14..	115	"	42	10	Branching..	56	16	34
Longhoughton	" 14..	115	"	40	10	"	56	16	34
Sensation.....	" 11..	112	"	42	9	"	55	10	34
Salines.....	" 9..	110	Medium..	44	8	"	55	10	34
American Triumph.....	" 14..	115	Stiff	48	9	"	55		34½
Wallis.....	" 13..	114	Medium..	46	8	"	54	14	34
Improved American.....	" 12..	113	Stiff	44	9	"	54	14	34
Russell.....	" 11..	112	"	42	10	"	52	2	34
Pense.....	" 11..	112	"	48	8	Sided.....	50	6	34½
Wide Awake.....	" 12..	113	Weak'	40	9	Branching..	48	8	33
Salzer's Big Four.....	" 13..	114	Medium..	43	9	"	47	12	32

EXPERIMENTS WITH BARLEY.

Fifty-one varieties of barley were under trial in 1902. Twenty-one of these were two-rowed sorts and thirty six-rowed. They were all sown at the rate of two bushels per acre on April 19 on plots of one-fortieth acre each. The land was adjoining that on which the oats were sown and was of similar character. This crop was also troubled with a considerable quantity of fern growth, hence the yield of straw is not given. The Barleys were all free from rust and smut.

BARLEY, TWO-ROWED.—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Yield per Acre.		Weight per Bushel.
			In.		In.	Bush.	Lbs.	Lbs.
Dunham.....	Aug. 13..	116	42	Stiff & bright.	3	52	44	49
Invincible.....	" 8..	111	40	"	2½	48	26	49½
Kinver Chevalier.....	" 14..	117	42	Weak.....	3½	48	16	48¾
Canadian Thorpe.....	" 9..	112	46	Stiff & bright.	2½	46	32	49
Prize Prolific.....	" 9..	112	38	Medium.....	3½	43	16	48
Harvey.....	" 8..	111	42	Stiff & bright.	4	40	30	48½
Newton.....	" 9..	112	40	"	3	40	20	48¾
Sidney.....	" 13..	116	41	Medium..	3½	39	8	49
Gordon.....	" 8..	111	42	Stiff & bright.	2½	38	6	48½
Standwell.....	" 12..	115	40	Medium.....	3	37	44	49½
Danish Chevalier.....	" 13..	116	38	Weak.....	3	37	24	48
Nepean.....	" 12..	115	42	Stiff & bright.	3½	36	32	48¾
Clifford.....	" 8..	111	44	"	3½	36	2	48½
Leslie.....	" 13..	116	40	"	2½	35	20	48
Jarvis.....	" 8..	111	44	"	3½	33	36	48¾
French Chevalier.....	" 15..	117	28	Weak.....	3½	33	16	48
Beaver.....	" 11..	114	36	"	3½	33	6	49
Victor.....	" 9..	112	41	Medium.....	3	31	4	48
Fulton.....	" 9..	112	40	"	2½	30	..	48
Bolton.....	" 6..	109	41	"	2½	29	28	48
Logan.....	" 9..	112	40	Weak.....	3½	25	10	47¾

BARLEY, SIX-ROWED.—TEST OF VARIETIES.

Summit.....	Aug. 6..	109	42	Medium.....	3	55	..	49¾
Rennie's Improved.....	" 4..	107	48	Stiff & bright.	3	52	24	49½
Oderbruch.....	" 4..	107	44	"	2½	50	40	49
Surprise.....	" 6..	109	44	Medium.....	3	50	40	49
Yale.....	" 5..	108	36	Stiff & bright.	2	40	10	49
Nugent.....	" 8..	111	44	"	3	40	..	48½
Pioneer.....	" 4..	107	33	Weak.....	2	39	38	48
Royal.....	" 4..	107	42	Stiff & bright.	2½	39	28	49
Vanguard.....	" 6..	109	38	"	2	39	18	48
Claude.....	" 6..	109	36	Medium.....	2	39	8	48½
Hulless White.....	" 9..	112	36	Weak.....	2	39	8	60
Mansfield.....	" 6..	109	40	Stiff & bright.	2	38	46	50
Mensury.....	" 6..	109	42	"	2½	38	36	49¼
Odessa.....	" 4..	107	40	"	2½	38	16	49
Champion.....	" 2..	105	48	Medium.....	4	38	6	49¼
Garfield.....	" 6..	109	40	"	3	37	41	48
Brome.....	" 8..	111	42	Stiff & bright.	3½	37	34	48½
Albert.....	" 4..	107	40	Medium.....	2	37	24	48
Stella.....	" 9..	112	36	Weak.....	2	37	4	48
Hulless Black.....	" 6..	109	34	Medium.....	1½	36	32	58
Trooper.....	" 9..	112	34	Weak.....	2½	36	22	48½
Phoenix.....	" 4..	107	42	Medium.....	2½	35	40	49½
Baxter.....	" 4..	107	40	"	2	35	30	49
Petschora.....	" 4..	107	38	Stiff & bright.	3	35	10	48½
Excelsior.....	" 2..	105	46	Medium.....	3½	35	..	49
Success.....	" 2..	105	42	"	3½	34	18	48
Argyle.....	" 6..	109	40	Stiff & bright.	3	34	8	48
Blue Longhead.....	" 8..	111	30	Weak.....	2½	32	44	47¾
Empire.....	" 6..	109	38	Stiff & bright.	3	32	34	48½
Common.....	" 4..	107	33	Medium.....	2	30	20	48

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EXPERIMENTS WITH SPRING WHEAT.

Seventy-one varieties of spring wheat were under trial all sown on plots of one-fortieth of an acre each. The land devoted to these plots was adjoining that on which the oats and barley were grown and was of similar character. The straw at harvest time was mixed in this case also with a considerable quantity of fern and on this account the weight of straw has been omitted. These plots were all sown on April 18, using grain in the proportion of $1\frac{1}{2}$ bushels per acre. There was no rust or smut on any of the varieties.

SPRING WHEAT.—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Character of Straw.	Length of Straw.	Length of Head.	Kind of Head.	Yield per Acre.	Weight per Bushel.
				Inches.	Inches.		Bush. Lbs.	Lbs.
Rio Grande.....	Aug. 19	123	Stiff & bright	46	$3\frac{1}{2}$	Bearded..	59 15	60
Colorado.....	" 15	119	" " "	42	4	" " "	57 30	60
Ladoga.....	" 11	115	" " "	44	4	" " "	57	60
Minnesota, No. 181.....	" 19	123	" " "	46	$3\frac{1}{2}$	Beardless..	56 30	$60\frac{1}{2}$
Progress.....	" 15	119	Medium....	44	$3\frac{1}{2}$	" " "	52	61
Campbell's White Chaff.....	" 16	120	Stiff & bright	40	$3\frac{1}{2}$	" " "	51	$60\frac{1}{2}$
Minnesota, No. 149.....	" 20	124	" " "	40	3	" " "	50 30	61
Dawn.....	" 11	115	" " "	46	3	" " "	50	61
Captor.....	" 11	115	" " "	44	$3\frac{1}{2}$	" " "	49 30	$60\frac{1}{2}$
Early Riga.....	" 9	113	Weak.....	40	3	" " "	49 15	60
Clyde.....	" 18	122	Medium....	40	3	" " "	49	60
Red Swedish.....	" 20	124	Stiff & bright	46	$3\frac{1}{2}$	Bearded..	48 45	61
Australian, No. 27.....	" 14	118	Medium....	44	3	" " "	48 30	61
Red Fife.....	" 19	123	Stiff & bright	40	3	Beardless..	48 15	61
Australian, No. 10.....	" 15	119	" " "	42	3	" " "	48	60
Admiral.....	" 19	123	" " "	48	$3\frac{1}{2}$	" " "	47 30	$60\frac{1}{2}$
Plumper.....	" 19	123	Medium....	42	3	" " "	47 15	60
Goose.....	" 16	120	Stiff & bright	42	3	Bearded..	47	60
Preston.....	" 11	115	" " "	44	$3\frac{1}{2}$	" " "	46 45	$60\frac{1}{2}$
Beaudry.....	" 16	120	" " "	42	$3\frac{1}{2}$	" " "	46 15	61
Blenheim.....	" 16	120	" " "	46	3	" " "	46	$60\frac{1}{2}$
Essex.....	" 20	124	Medium....	46	4	Beardless..	45 45	60
Monarch.....	" 15	119	Stiff & bright	42	3	" " "	45 30	60
Laurel.....	" 16	120	Medium....	46	3	" " "	45 30	61
White Fife.....	" 18	122	Weak.....	42	3	" " "	45 15	60
Stanley.....	" 12	116	Stiff & bright	46	$3\frac{1}{2}$	" " "	45	$60\frac{1}{2}$
Advance.....	" 11	115	" " "	46	3	Bearded..	44 45	60
Benton.....	" 20	124	Weak.....	44	4	Beardless..	44 30	60
Crown.....	" 12	116	Stiff & bright	46	3	Bearded..	44 15	60
White Russian.....	" 19	123	Medium....	42	3	Beardless..	44	60
Harrison Bearded.....	" 16	120	Stiff & bright	42	$3\frac{1}{2}$	Bearded..	43 45	60
Chester.....	" 18	122	Medium....	42	$3\frac{1}{2}$	Beardless..	43 30	60
Blair.....	" 16	120	" " "	38	$3\frac{1}{2}$	" " "	43	50
Minnesota, No. 163.....	" 18	122	Weak.....	36	$3\frac{1}{2}$	" " "	42 30	60
Rideau.....	" 18	122	" " "	42	$2\frac{1}{2}$	Bearded..	41 45	60
Roumanian.....	" 20	124	Stiff & bright	40	$2\frac{1}{2}$	" " "	41 30	$60\frac{1}{2}$
Australian, No. 19.....	" 18	122	" " "	48	3	Beardless..	41 15	61
Fraser.....	" 11	115	Medium....	40	3	Bearded..	41 15	60
Dufferin.....	" 11	115	Stiff & bright	40	3	" " "	41	$60\frac{1}{2}$
Angus.....	" 19	123	Weak.....	44	4	Beardless..	40 45	60
Australian, No. 23.....	" 18	122	Stiff & bright	50	5	" " "	40 30	60
Hastings.....	" 11	115	Weak.....	42	$3\frac{1}{2}$	" " "	40 15	60
Australian, No. 25.....	" 18	122	" " "	44	4	Bearded..	40	60
Hungarian.....	" 18	122	Stiff & bright	46	$3\frac{1}{2}$	" " "	40	61
Percy.....	" 16	120	" " "	44	3	Beardless..	39 45	60
White Connell.....	" 15	119	Weak.....	38	$2\frac{1}{2}$	" " "	39 30	60
Bishop.....	" 11	115	" " "	40	3	" " "	39 15	60

SPRING WHEAT—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of Ripen- ing.	No. of Days Maturing.	Character of Straw.	Length of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.
				In.	In.		Bush.	Lbs.	Lbs.
Vernon.....	Aug. 12	116	Medium....	42	3½	Bearded..	39		60
Byron	" 12	116	"	36	3	" ..	38	45	60
Minnesota, No. 169.....	" 18	122	Stiff & bright	48	3½	Beardless.	38	30	60½
Mason	" 20	124	Weak	40	2½	" ..	38	15	60
Pringle's Champlain	" 20	124	Stiff & bright	40	3	Bearded..	38		60
Beauty.	" 19	123	" ..	44	3½	Beardless.	37	45	60
Red Fern	" 18	122	" ..	40	3½	Bearded..	37	45	60
Crawford.....	" 11	115	Weak	40	2½	" ..	37	30	60
Robin's Rust Proof.....	" 20	124	Medium....	40	3½	Beardless.	37	15	60
Speltz.	" 20	124	Weak	40	2	Bearded..	37		59
Australian, No. 9... ..	" 19	123	Stiff & bright	41	3	Beardless.	37		60
Harold	" 9	113	Medium	40	3½	Bearded..	36	45	60
Dion's.....	" 16	120	Stiff & bright	42	3½	" ..	36	30	60
Countess.....	" 18	122	Weak	42	2½	Beardless.	36	15	60½
Cartier.....	" 15	119	Medium....	40	3	Bearded..	36		61
Cassel	" 14	118	" ..	48	3½	Beardless.	35	45	60
Huron.....	" 12	116	Stiff & bright	40	3	Bearded..	35	30	60
Alpha	" 15	119	Medium....	44	3½	Beardless.	35	15	60½
Wellman's Fife.....	" 15	119	Stiff & bright	44	3	" ..	35		61
Ebert.....	" 11	115	Weak	38	3	" ..	34	30	60
Australian, No. 13....	" 18	122	Medium....	43	2½	" ..	33		60
Weldon.....	" 15	119	" ..	42	3	" ..	32		60
Norval	" 11	115	Stiff & bright	42	3	Bearded..	31		60
Japanese	" 11	115	Medium....	36	2½	" ..	30		60

PEASE.

Fifty-seven varieties of field pease were sown April 22 in plots of one-fortieth of an acre. They were sown in one of the apple orchards and a strip of six feet on each side of the rows of trees was left, yet the shade cast by the trees retarded ripening and made curing the crop very difficult. The vines made a vigorous growth and blossomed profusely, but the late bloom didnot fill well. The soil was a light loam and had a crop of clover turned under in spring and was thoroughly disked and harrowed before the seed was sown. There was no mildew on the vines, and as we had no insect pests, the sample of grain is a good one.

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PEASE—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Character of Growth.	Length of Straw.	Weight of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.	Weight per Bushel.
				Inches.	Lbs.	Inches.		Bush. Lbs.	Lbs.
Prince.....	Aug. 15	115	Strong.....	40	6,680	2½	Large....	45 20	62½
Large White Marrow fat..	" 15	115	".....	48	6,480	2½	".....	43 ..	62
White Wonder.....	" 15	115	".....	60	6,400	2½	Medium..	42 30	62½
Agnes.....	" 11	111	Medium....	60	5,280	3	".....	41 40	61
Golden Vine.....	" 15	115	Strong.....	60	6,400	2½	Small...	41 20	62
Mummy.....	" 20	120	".....	45	5,320	2½	Medium..	40 30	61½
Mackay.....	" 19	119	".....	56	5,600	2½	".....	40 10	61
Trilby.....	" 14	114	".....	60	5,200	2½	".....	39 30	62
Nelson.....	" 11	111	Medium....	60	5,280	3	".....	39 10	61
Centennial.....	" 18	118	Strong.....	50	5,000	2	".....	38 50	60½
Prince Albert.....	" 16	116	Medium....	50	5,600	2½	Small....	38 40	62½
Harrison's Glory..	" 13	113	Strong.....	70	4,800	3½	Large....	38 30	61½
Pearl.....	" 18	118	".....	78	4,640	2½	".....	38 20	60½
Pride.....	" 14	114	".....	56	6,200	2	".....	38 10	61½
King.....	" 18	118	".....	54	5,600	3	".....	38 ..	61
Arthur.....	" 13	113	".....	48	4,720	2	".....	37 50	61
Fenton.....	" 14	114	Medium....	46	5,200	2½	".....	37 40	60
Bedford.....	" 26	126	".....	58	5,440	2	Medium..	37 30	61
Picton.....	" 16	116	Strong.....	52	6,080	2½	".....	37 20	61½
Cooper.....	" 14	114	Medium....	52	5,000	3	Large....	37 10	62
Prussian Blue.....	" 15	115	".....	50	4,800	2½	Medium..	36 30	62½
Paragon.....	" 19	119	Strong.....	60	4,080	2½	".....	36 ..	61
Bruce ..	" 20	120	".....	50	4,640	2½	Large....	35 40	60
Kent.....	" 18	118	".....	52	4,480	2½	".....	35 30	60
Alma.....	" 14	114	".....	56	5,740	3	".....	35 20	60½
Multiplier.....	" 15	115	".....	54	5,680	2	Small....	35 20	61½
Canadian Beauty...	" 19	119	".....	56	5,250	2½	Large....	35 10	62
Bright.....	" 14	114	".....	48	5,120	2½	".....	35 ..	61
Black-eyed Marrow-fat ..	" 14	114	".....	54	5,200	3	".....	34 40	60
Creeper.....	" 12	112	".....	63	4,960	3	Small....	34 30	61
Vincent.....	" 16	116	".....	60	4,320	2½	Large....	33 40	60
Victoria.....	" 21	121	Medium....	52	5,040	3	Medium..	33 20	60½
Early Britain.....	" 13	113	Strong.....	53	4,400	3	Large....	33 10	61
Lanark.....	" 14	114	".....	44	5,520	2½	".....	33 ..	60
Macoun.....	" 21	121	Medium....	52	5,520	2	".....	32 50	60½
Gregory.....	" 14	114	Strong.....	54	4,800	2½	Medium..	32 40	61
Fergus.....	" 18	118	".....	48	4,560	2½	".....	32 30	60
New Potter.....	" 14	114	".....	72	4,800	3	Large....	32 ..	60
Crown.....	" 19	119	".....	52	4,480	2½	Small....	31 40	60½
Elephant Blue	" 15	115	".....	54	5,120	2½	Large....	31 ..	61
Oddfellow.....	" 18	118	Medium....	44	4,600	3	Medium..	30 50	61½
Perth.....	" 14	114	Strong.....	48	4,640	2½	".....	30 40	60
Archer.....	" 21	121	".....	50	4,200	2½	Medium..	30 ..	61
Duke.....	" 25	125	".....	60	4,720	2½	Large....	29 40	60
English Gray.....	" 14	114	".....	56	5,740	3	".....	29 30	60
Herald.....	" 25	125	".....	52	5,400	2½	".....	29 20	60
Chancellor.....	" 18	118	".....	54	5,080	3	Medium..	29 10	61
Elliot.....	" 18	118	".....	62	4,000	2½	".....	29 ..	60
Chelsea.....	" 26	126	".....	46	4,800	3	".....	28 40	60½
Daniel O'Rourke ..	" 11	111	".....	56	4,080	2	Small....	28 ..	62
Dover.....	" 14	114	".....	72	5,200	3	Large....	27 40	60
German White.....	" 11	111	".....	50	4,080	2½	Medium..	27 20	60
Wisconsin Blue....	" 21	121	".....	64	4,320	2½	Small....	27 ..	62½
Elder.....	" 19	119	Medium....	52	4,240	2½	Medium..	24 40	60
French Canner.....	" 16	116	Strong.....	60	4,120	2½	".....	24 20	60
Carleton.....	" 22	122	".....	72	4,240	2½	".....	22 10	60
Grass Pea.....	Sept. 5	136	Poor....	30	4,000	1½	Small....	19 30	60

TEST OF FERTILIZERS ON OATS.

Six plots of one-fortieth of an acre each, were included in this trial. The soil was the same as for the other oat plots.

Plot 1.—Received 100 lbs. nitrate of soda, 50 lbs. per acre, sown broadcast when the plants were well above ground, and the other 50 lbs. when the plants were about 6 inches high.

Plot 2.—Two hundred lbs. nitrate of soda, one-half sown as soon as the plants were well up, and the other half when they were about 6 inches high.

Plot 3.—Check plot to which no fertilizers were applied.

Plot 4.—Four hundred lbs. superphosphate of lime sown broadcast and lightly harrowed just before the grain was sown.

Plot 5.—Four hundred lbs. muriate of potash sown broadcast and harrowed before the seed was sown.

Plot 6.—Two hundred lbs. superphosphate of lime, 100 lbs. muriate of potash, and 100 lbs. of nitrate of soda. One-half of this mixture was sown before the seed was put in, and the other half when the plants were about 2 inches high.

The straw on the check plot was weak and soft, also that where nitrate of soda alone was used, and both were badly lodged. There was no rust or smut on any of these plots.

OATS —FERTILIZER TEST.

Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
				Lbs.	Bush.	Lbs.	Lbs.
Banner, Plot 1, 100 lbs. nitrate of soda	May 1..	Aug. 18	109	5,120	74	4	35
" " 2 200 lbs. "	1..	18	109	5,560	79	14	35
" " 3, check plot, no fertilizer.	1..	18	109	4,160	71	16	35
" " 4, 400 lbs. superphosphate.	1..	18	109	5,680	90	..	35
" " 5, 400 lbs. muriate potash.	1..	18	109	5,600	86	1	35½
" " 6, 100 lbs. muriate potash.							
200 lbs. superphosphate, 100 lbs. ni- trate soda.	May 1..	Aug. 18	109	5,920	96	16	35½

CORN.

Thirty-six varieties of corn were tested this year. All the test plots were planted May 23, and cut for ensilage on October 10. Most of the land was comparatively new, having only produced two crops since the timber was taken off, and the subsoil being very gravelly, it was very uneven in character on account of the excavations where large fir stumps had been taken out. This land was sown with clover in 1900, and with pease in 1901, May, June and the early part of July was very wet and cold, and the corn was very late, having made but little growth up to July, but when bright, warm weather set in, the growth was rapid, but it was too late for any but the earliest varieties to produce well grown ears. All varieties were tested both in hills and drills. The drills were 36 inches apart and thinned to average six inches apart in the drill. The hills were 36 inches apart each way and thinned to three strong plants in each hill. The yield was calculated in each case from the weight of two rows each 66 feet long.

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CORN.—TEST OF VARIETIES.

Name of Variety.	When Tasselled.	In Silk.	Early Milk.	Late Milk.	Condition when Cut.	Weight per acre grown in rows.		Weight per acre grown in hills.	
						Tons.	Lbs.	Tons.	Lbs.
Thoroughbred White Flint.	Sept. 6..	Oct. 4	.....	.....	In silk.....	30	1,600	25	1,040
Pride of the North.....	" 1..	Sept. 10	Oct. 6	.....	Early milk..	25	1,480	22	440
Extra Early Huron.....	Aug. 12..	Aug. 28	Sept. 20	.....	Roasting...	24	1,500	21	1,780
Giant Prolific Ensilage.....	Sept. 1..	Sept. 20	.....	.....	Ears forming	22	1,760	25	600
Salzer's All Gold.....	" 6..	Oct. 6	.....	.....	In silk.....	22	1,320	26	360
Champion White Pearl.....	" 3..	Sept. 20	Oct. 10	.....	Early milk..	22	880	22	220
Superior Fodder.....	" 1..	" 20	.....	.....	Ears formed.	22	660	22	..
Red Cob Ensilage.....	Aug. 20..	" 4	Sept. 20	Oct. 10	Late milk...	22	440	21	240
Early Mastodon.....	Sept. 6..	Oct. 1	.....	.....	In silk.....	22	220	25	1,920
Early Yellow Long Eared..	Aug. 8..	Aug. 20	Sept. 25	Oct. 2	Glazed.....	22	..	16	1,520
Early Butler.....	" 24..	Sept. 10	Oct. 4	.....	Early milk..	21	680	17	980
King of the Earliest.....	Sept. 1..	" 28	.....	.....	Ears formed.	21	460	20	700
Mammoth Cuban.....	Aug. 26..	" 10	Oct. 3	.....	Early milk..	20	1,690	19	1,820
Wisconsin Earliest Ripe....	" 19..	Aug. 28	Sept. 20	.....	Late milk...	19	1,160	21	1,560
Mammoth 8-rowed Flint...	Sept. 1..	Sept. 20	.....	.....	Early milk..	19	830	19	60
Country Gentleman.....	" 1..	" 28	.....	.....	Ears formed.	18	1,950	16	120
King Philp.....	Aug. 14..	Aug. 28	Sept. 20	Oct. 4	Late milk...	18	1,840	17	1,640
Cloud's Early Yellow.....	" 26..	Sept. 12	Oct. 10	.....	Early milk..	18	1,400	17	1,200
Pearce's Prolific.....	" 14..	Aug. 24	Sept. 20	Oct. 10	Late milk..	18	1,180	16	1,880
Evergreen Sugar.....	Sept. 1..	Sept. 20	.....	.....	Ears formed.	18	960	16	1,990
Compton's Early.....	Aug. 18..	Aug. 23	Sept. 18	..	Roasting ear	18	520	16	1,220
Kendall's Early Giant.....	" 18..	" 20	" 6	Oct. 10	Late milk...	17	760	18	960
Early Golden Surprise.....	Sept. 1..	Sept. 20	.....	.....	Ears formed.	17	650	20	1,860
North Dakota White.....	Aug. 24..	" 8	Sept. 30	..	Early milk..	17	320	17	1,200
Selected Leaming.....	" 28..	" 8	" 28	Oct. 10	Late milk...	17	100	16	1,880
Angel of Midnight.....	" 28..	" 12	Oct. 4	..	Early milk..	16	1,660	17	760
Sanford.....	" 20..	Aug. 28	Sept. 15	Oct. 4	Dough.....	16	780	14	1,700
Canada White Flint.....	" 12..	" 23	" 10	" 1	Nearly glzd.	16	450	18	300
White Cap Yellow Dent....	" 22..	" 30	" 15	Sept. 30	Late milk...	16	230	16	560
Black Mexican.....	" 20..	Sept. 8	" 26	.....	Roasting...	16	120	15	1,460
Salzer's Earliest Ripe.....	" 7..	Aug. 18	Aug. 26	Sept. 20	Glazed.....	15	1,900	15	1,240
North Dakota Yellow...	" 24..	Sept. 10	Oct. 6	..	Early milk..	15	140	17	100
Longfellow.....	" 28..	" 13	Sept. 20	.....	Late milk...	14	1,040	14	1,480
Eureka.....	" 24..	" 18	" 28	..	Early milk..	13	1,500	15	800
Yellow Six Weeks.....	" 8..	Aug. 18	" 21	Sept. 24	Glazed.....	11	1,760	13	1,280
Mitchell's Extra Early.....	" 11..	" 20	" 4	" 20	".....	11	1,650	11	110
Very Early August.....	Only a few	plants	grew from 10-12		in. high.				

CORN—AT DIFFERENT DISTANCES APART.

Three varieties were used in this test again this year.

The plants in the rows were thinned to six inches apart and to three strong plants in the hills. The conditions of soil and the treatment were the same in every case. The corn in the wide rows was in each instance more matured, the ears larger and better filled and in every way better for ensilage. In each test four rows were planted and the two inside rows were weighed to obtain the yield. The corn was planted May 23 and cut October 10.

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CORN.—AT DIFFERENT DISTANCES APART.

Name of Variety.	Distance in Rows.	In Hills.	Condition when cut.	Weight per Acre grown in rows.		Weight per Acre grown in hills.	
	Inches.	Inches.		Tons.	Lbs.	Tons.	Lbs.
Champion White Pearl.....	21	21	Early milk..	28	571	25	537
" "	28	28	" ..	23	356	19	520
" "	35	35	" ..	22	1,257	17	1,456
" "	42	42	Late milk ..	19	1,600	17	1,074
Selected Leaming	21	21	Early milk..	28	41	22	1,120
"	28	28	" ..	25	1,627	25	165
"	35	35	" ..	18	1,111	18	432
"	42	42	Late milk ..	18	1,800	15	1,374
Longfellow.....	21	21	Early milk..	19	469	18	205
"	28	28	" ..	18	139	18	1,429
"	35	35	" ..	14	965	15	1,168
"	42	42	Late milk ..	11	73	12	943

TEST OF SUPERPHOSPHATE OF LIME ON INDIAN CORN.

These test plots were on land that had been in clover in 1900 and in pease in 1901, and the superphosphate was applied broadcast alongside of the hills when the corn was three or four inches high.

CORN.—WITH FERTILIZER.

Name of Variety.	Date of Sowing.	Cut.	Weight per Acre grown in rows.	
			Tons.	Lbs.
Longfellow—100 lbs. superphosphate per acre... ..	May 24.....	Oct. 10.....	15	1,460
" 150 "	May 24.....	Oct. 10.....	16	450
" 200 "	May 24.....	Oct. 10.....	17	210
" No fertilizer	May 24.....	Oct. 10.....	14	920

EXPERIMENTS WITH TURNIPS.

Twenty-nine varieties of turnips have been under trial during the past season. Two sowings of each sort were made ; the first on May 22, the second on June 5, in rows two feet apart, and all were pulled on October 24.

The soil was sandy loam on which grain had been grown the previous year. After the grain was harvested the land was disc-harrowed, and later a dressing of barn-yard manure was applied and thoroughly worked into the soil. In the spring it was ploughed and harrowed and brought into a good condition of tilth before sowing.

The yield per acre has been calculated from the weight of roots gathered from two rows, each 66 feet long.

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TURNIPS.—TEST OF VARIETIES.

Name of Variety.	Yield per Acre.		Yield per Acre.		Yield per Acre.		Yield per Acre.	
	1st Plot.		1st Plot.		2nd Plot.		2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Carter's Elephant.....	31	40	1,034	..	32	1,670	1,094	30
Jumbo.....	28	265	937	45	28	1,420	957	..
Hall's Westbury.....	28	100	935	..	30	720	1,012	..
Skirvings.....	27	440	924	..	26	140	869	..
Prize Winner.....	27	120	902	..	28	430	940	30
Marquis of Lorne.....	26	1,955	899	15	26	470	874	39
Drummond Purple Top..	26	1,130	885	30	28	1,090	951	30
Kangaroo.....	26	800	880	..	25	160	836	..
Champion Purple Top.....	26	470	874	30	30	70	1,001	10
Emperor Swede.....	26	140	869	..	28	1,420	957	..
Perfection Swede.....	25	1,448	858	..	24	840	814	..
Prize Purple Top.....	25	820	847	..	26	140	869	..
Good Luck.....	25	160	836	..	28	1,420	957	..
Selected Purple Top.....	25	160	836	..	27	1,440	924	..
New Century.....	24	1,560	825	..	30	70	1,001	10
New Arctic.....	24	840	814	..	26	140	809	..
Monarch.....	24	675	811	15	20	920	882	..
Magnum Bonum.....	24	675	811	15	27	120	302	..
Giant King.....	23	1,850	797	30	23	1,530	792	10
Imperial Swede.....	23	1,520	792	..	29	740	979	..
Halewood's Bronze Top.....	23	1,355	789	15	27	1,440	924	..
Elephant's Master.....	23	860	781	..	26	1,460	891	..
Shamrock Purple Top.....	22	880	748	..	30	60	1,001	..
Sutton's Champion.....	21	240	704	..	28	1,090	951	30
East Lothian.....	20	920	682	..	27	780	913	..
Bangholm Selected.....	20	590	676	30	26	1,865	897	45
West Norfolk Red Top.....	20	425	673	45	21	240	704	..
Webb's New Renown.....	19	160	660	..	16	1,330	555	30
Selected Champion.....	16	1,660	561	..	19	1,600	660	..

EXPERIMENTS WITH MANGELS.

Twenty-seven varieties of mangels were tested alongside, sown in drills thirty inches apart. The soil was a clay loam, a heavy clover sod had been ploughed under in the spring of 1901 and a crop of mixed grain for feed grown. In the winter of 1901-1902 it was dressed with farm-yard manure, which was well mixed with the soil and turned under in April and thoroughly harrowed every few days until May 6, when the first sowing was made. Four rows of each variety were sown and on May 20 a similar plot alongside was sown with the same variety in each case. All these test plots were pulled October 22, and the yield per acre computed from the produce of 66 feet of the two centre rows in each plot.

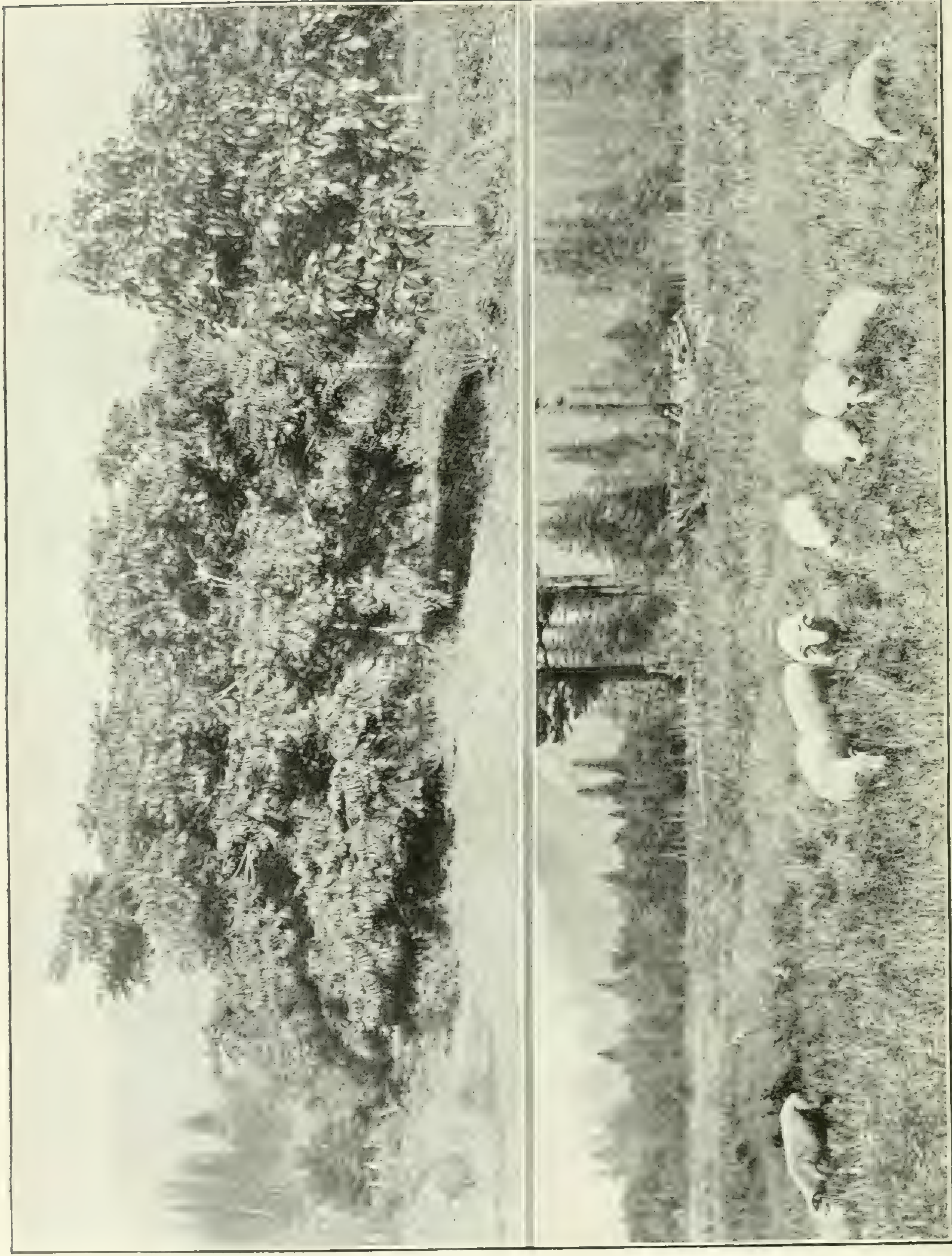
MANGELS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre, 1st Plot.		Yield per Acre, 1st Plot.		Yield per Acre, 2nd Plot.		Yield per Acre, 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Mammoth Long Red.	51	1,620	1,727	..	37	580	1,243	
Warden Orange Globe.....	48	360	1,606	..	34	1,630	1,160	30
Lion Yellow Intermediate.....	47	1,700	1,595	..	38	890	1,231	30
Half Long Sugar White.....	46	400	1,540	..	36	1,920	1,232	..
Giant Yellow Intermediate.....	45	1,080	1,518	..	36	1,590	1,226	30
Selected Mammoth Long Red.....	45	750	1,512	30	37	1,900	1,265	..
Ward's Large Oval Shaped.	43	1,285	1,454	45	38	230	1,270	30
Champion Yellow Globe.....	42	1,800	1,430	..	32	1,505	1,091	45
Yellow Intermediate.....	42	1,140	1,419	..	38	1,220	1,287	..
Canadian Giant.....	42	975	1,416	15	34	970	1,149	30
Prize Mammoth Long Red.....	41	1,820	1,397	..	36	270	1,204	30
Mammoth Oval Shaped.....	41	830	1,380	30	27	285	904	85
Giant Yellow Globe.....	41	500	1,375	..	32	680	1,078	..
Giant Sugar Mangel.....	40	685	1,344	45	28	100	935	..
Half Long Sugar Rosy.....	40	25	1,333	45	42	1,800	1,430	..
Norbiton Giant.....	38	1,220	1,288	..	31	40	1,034	..
Prize Mammoth Long Red.....	38	1,055	1,284	15	33	330	1,105	30
Selected Yellow Globe.....	38	890	1,281	30	28	430	940	30
Gate Post.....	37	1,570	1,259	30	36	1,920	1,232	..
Yellow Fleshed Tankard.....	36	1,920	1,232	..	26	800	880	..
Prize Winner Yellow Globe.....	36	1,590	1,226	30	26	800	880	..
Golden Fleshed Tankard.....	36	1,260	1,221	..	32	1,670	1,094	30
Giant Yellow Half Long.	36	600	1,210	..	26	1,460	891	..
Mammoth Yellow Intermediate.....	32	1,670	1,094	30	33	330	1,155	..
Gate Post Yellow.....	32	1,340	1,089	..	31	1,690	1,061	30
Triumph Yellow Globe.....	31	700	1,045	..	26	865	881	5
Leviathan Long Red.....	31	40	1,034	..	30	1,050	1,017	30

EXPERIMENTS WITH CARROTS.

Twenty varieties of carrots were tested alongside of the turnips and mangels. The land was similar and its preparation and treatment were the same. Two sowings of each sort were made, four rows each, the first on May 6, the second on May 20, and both were pulled October 28. The yield per acre has been calculated from the weight of roots produced from two centre rows each 66 feet long. All were pulled October 22.





PLANTATION OF NUT TREES. DORSET HORNED SHEEP, EXPERIMENTAL FARM, AGASSIZ, B.C.

CARROTS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Giant White Vosges.	46	400	1,510	..	38	1,640	1,294	..
White Belgian.....	42	1,800	1,430	..	39	1,200	1,320	..
Mammoth White Intermediate.....	40	520	1,342	..	31	370	1,039	30
White Vosges.....	40	400	1,340	..	31	310	1,038	30
Improved Short White.....	40	190	1,336	30	39	540	1,309	..
Green Top White Orthe.....	39	540	1,309	..	34	1,795	1,163	15
Iverson's Champion.....	38	1,220	1,287	..	32	680	1,078	..
New White Intermediate	38	1,055	1,284	15	34	970	1,149	30
Ontario Champion.	35	660	1,111	..	25	820	847	..
Carter's Orange Giant.....	31	700	1,045	..	30	1,710	1,028	30
Half Long White.....	29	1,520	992	..	29	1,730	995	30
Half Long Chantenay... ..	27	285	904	45	22	395	739	45
Early Gem.....	25	160	831	20	21	1,890	731	30
Yellow Intermediate.....	23	1,190	786	30	21	1,890	731	30
Guerande or Ox-heart.....	22	1,870	764	30	21	1,560	726	..
Long Yellow Stump Rooted.....	20	920	6-2	..	17	1,970	599	30
Scarlet Intermediate.....	20	590	676	30	18	1,620	627	..
Long Orange, or Surrey.....	18	960	616	..	16	1,660	561	..
Scarlet Nantes.....	17	320	572	..	16	505	641	45
Long Scarlet Altringham.....	16	1,990	566	30	16	670	544	30

EXPERIMENTS WITH SUGAR BEETS.

Eight varieties of sugar beets were tested on plots adjoining those of the turnips and mangels. The soil was similar and its treatment and preparation were the same. Two sowings of each sort were made, the first on May 7, the second on May 21, and both were pulled on October 22. Four rows of each sort were sown and the yield has been calculated from the weight of roots gathered from the two centre rows, each 66 feet long.

SUGAR BEETS.—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Danish Improved.....	38	230	1,270	30	26	1,460	891	..
Royal Giant.....	37	580	1,243	..	26	140	869	..
Danish Red Top.....	29	1,730	995	30	25	1,580	859	40
Red Top Sugar.....	27	1,935	932	15	26	305	871	45
Wanzleben... ..	26	1,460	891	..	27	780	913	..
French 'Very Rich'	26	635	877	15	26	800	880	..
Improved Imperiat	26	470	874	30	19	1,600	660	..
Vilmorin's Improved.....	23	200	770	..	24	840	814	..

POTATOES.

Ninety varieties were included in this test. The soil was a sandy loam, part of which had been in rape and part sunflowers in 1901. It was fairly even in character, and the crop looked very vigorous in June and July, but later on suffered somewhat from the dry hot weather. The vines made a medium growth.

Four rows of 100 feet in length were planted, the rows being 2½ feet apart and the sets 1 foot apart in the row, and the yield per acre computed from the yield of 66 feet of the two centre rows.

POTATOES.—TEST OF VARIETIES.

Name of Variety.	Planted.	Dug.	Total Yield per Acre.		Yield per Acre of Sound.		Yield per Acre of Rotten.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Maule's Thoroughbred.	May 14	Sept. 24	386	36	371	36	15	..	320	..	51	36	Long rose.
Irish Daisy	" 14	" 25	385	..	369	30	17	30	256	..	113	30	Round white.
Early Norther	" 14	" 22	383	18	366	30	16	48	292	30	74	..	Long pink.
American Giant.....	" 14	" 24	381	40	364	10	17	30	323	..	41	30	" white.
Prolific Rose	" 14	" 29	374	30	374	30	None..	..	336	30	38	..	" rose.
Carman No. 1.....	" 14	" 23	372	54	372	54	" ..	..	298	24	74	30	Round white.
Early Market	" 14	" 22	369	36	369	36	" ..	..	277	6	92	30	Oval rose.
Columbus.	" 14	" 23	369	..	352	30	17	30	262	30	91	..	Long flat rose.
Money Maker	" 14	" 30	369	..	369	..	None..	..	271	..	98	..	" white.
General Gordon	" 14	" 23	367	37	367	37	" ..	..	313	..	54	37	Oval pink.
Sharpe's Seedling	" 14	" 24	367	4	367	4	" ..	..	294	4	73	..	Long round rose.
Rose No. 9.....	" 14	" 25	366	51	366	51	" ..	..	313	23	53	28	" rose.
Everett	" 14	" 25	363	..	363	..	" ..	..	326	30	36	30	" round red.
White Beauty	" 14	" 24	363	..	363	..	" ..	..	291	..	72	..	Flat long white.
Irish Cobbler	" 14	" 24	361	54	361	54	" ..	..	306	54	55	..	Round white.
Early Puritan.....	" 14	" 30	361	54	361	54	" ..	..	310	54	61	..	Long white.
Dakota Red	" 14	" 29	360	48	360	48	" ..	..	324	48	36	..	" red.
Bill Nye.....	" 14	" 27	358	36	358	36	" ..	..	305	48	42	48	Oblong white.
Brownell's Winner....	" 14	" 25	357	30	357	30	" ..	..	300	18	57	12	Long red.
Seedling No. 230	" 14	" 30	356	24	356	24	" ..	..	299	36	56	48	Round red.
Troy Seedling.....	" 14	" 30	355	51	355	51	" ..	..	274	..	88	51	Long red.
McIntyre	" 14	" 24	354	12	354	12	" ..	..	248	12	106	..	" pink.
Northern Spy	" 14	" 25	353	6	353	6	" ..	..	282	6	71	..	" "
Country Gentleman...	" 14	" 27	352	..	352	..	" ..	..	295	30	56	30	" " and white.
Canadian Beauty	" 14	" 22	351	27	351	27	" ..	..	263	37	87	50	" flat.
Sabean's Elephant	" 14	" 22	350	54	350	54	" ..	..	280	54	70	..	" " white.
Houlton Rose	" 14	" 23	350	21	350	21	" ..	..	298	..	52	21	" " rose.
Vanier	" 14	" 23	349	58	349	58	" ..	..	175	58	174	..	" red.
Early Michigan.....	" 14	" 29	348	42	348	42	" ..	..	295	12	53	30	" white.
Early St. George	" 14	" 30	348	9	348	9	" ..	..	293	17	54	48	" "
Burnaby Seedling.....	" 14	" 25	347	50	347	50	" ..	..	296	20	51	30	" rose.
Chicago Market	" 14	" 23	347	36	347	36	" ..	..	343	20	104	16	" dark red.
Swiss Snowflake	" 14	" 22	347	..	347	..	" ..	..	234	..	113	..	" white.
Pearce's Extra Early..	" 14	" 25	347	..	331	30	15	30	282	15	49	15	Oblong rose.
State of Maine.....	" 14	" 25	346	30	346	30	None..	..	276	30	70	..	Long pink.
Clay Rose	" 14	" 27	345	57	345	57	" ..	..	259	7	86	50	" rose.
Earliest of All	" 14	" 25	345	24	345	24	" ..	..	276	24	69	..	Round white.
Cambridge Russet ...	" 14	" 25	345	24	345	24	" ..	..	234	24	111	..	" russet.
Polaris	" 14	" 25	344	18	344	18	" ..	..	282	28	61	50	Long pink.
Early Harvest	" 14	" 25	342	12	342	12	" ..	..	282	12	60	..	" white.
Early Six Weeks	" 14	" 22	342	12	342	12	" ..	..	256	42	85	30	Oblong rose.
Great Divide	" 14	" 23	341	..	341	..	" ..	..	238	30	102	30	Round white.
Uncle Sam	" 14	" 23	339	54	339	54	" ..	..	238	54	101	..	" "
Prize Taker	" 14	" 25	334	22	334	22	" ..	..	269	22	65	..	" red.
Wonder of the World..	" 14	" 25	333	16	333	16	" ..	..	283	30	49	45	Long rose.
Penn. Manor	" 14	" 27	332	12	332	12	" ..	..	259	12	73	..	" red.
Early White Prize....	" 14	" 22	331	6	331	6	"	239	6	92	..	Oblong white.
Early Rose	" 14	" 22	330	..	330	..	"	280	10	49	50	" rose.

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POTATOES.—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Planted.		Dng.	Total Yield per Acre.		Yield per Acre of Sound.		Yield per Acre of Rotten.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
				Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
American Wonder	May	14	Sept.	22	328	54	328	54	None..	263	..	65	54	Long flat white.
Early Ohio	"	14	"	25	328	51	318	21	10 30	212	51	166	..	Oblong rose.
Enormous	"	14	"	23	327	48	327	48	None..	245	48	82	..	Long white.
Holborn Abundance ..	"	14	"	24	326	42	326	42	" ..	278	..	48	42	Round white.
Rural Blush	"	14	"	27	325	36	325	36	" ..	209	36	116	..	" rose.
Pride of the Market...	"	14	"	30	324	30	311	52	12 48	246	48	78	..	Long flat white.
Beauty of Hebron	"	14	"	30	323	24	323	24	None ..	258	54	64	30	" white.
Early Andes.....	"	14	"	24	322	51	322	51	" ..	290	..	32	51	Round rose.
Seedling No. 7.....	"	14	"	29	322	18	322	18	" ..	276	18	46	..	Long red.
Peacre's Prize Winner.	"	14	"	22	321	45	321	45	" ..	257	75	64	30	" pink and white.
Burpee's Extra Early ..	"	14	"	23	321	12	321	12	" ..	192	32	128	40	" rose.
Sutton's Invincible....	"	14	"	24	319	..	319	..	" ..	254	..	65	..	" white.
Sir Walter Raleigh ...	"	14	"	29	317	54	317	54	" ..	279	54	38	..	Flat "
Quaker City	"	14	"	29	316	48	316	48	" ..	177	48	139	..	" "
Bovee.....	"	14	"	30	313	20	313	20	" ..	266	32	46	48	Long rose.
Flemish Beauty	"	14	"	30	311	18	311	18	" ..	218	..	93	18	" flat rose.
Reeves' Rose.....	"	14	"	29	310	12	310	12	" ..	247	12	63	..	" rose.
New Queen.....	"	14	"	30	309	39	309	39	" ..	247	39	62	..	" round red.
Empire State.....	"	14	"	25	309	6	309	6	" ..	247	18	61	48	" pink and white.
Rawdon Rose.....	"	14	"	25	308	..	308	..	" ..	255	24	52	36	" rose.
Seattle	"	14	"	29	308	..	308	..	" ..	210	..	98	..	" round white.
Delaware.....	"	14	"	29	306	54	306	54	" ..	213	54	93	..	Round white.
Early Sunrise.....	"	14	"	24	302	30	302	30	" ..	224	30	78	..	Long rose.
Vick's Extra Early ...	"	14	"	25	302	30	302	30	" ..	197	..	105	30	Round pale rose.
Ohio Junior.....	"	14	"	23	299	12	299	12	" ..	239	24	59	48	Long pink.
Lee's Favourite.....	"	14	"	24	298	6	298	6	" ..	232	10	65	56	" rose.
Late Puritan.....	"	14	"	29	297	..	297	..	" ..	237	36	59	24	" white.
Lizzie's Pride.....	"	14	"	27	293	22	293	22	" ..	234	46	58	36	" red.
Rochester Rose	"	14	"	25	289	18	289	18	" ..	203	..	86	18	" rose.
Clarke's No. 1.....	"	14	"	29	286	..	286	..	" ..	243	30	42	30	" pink.
Daisy.....	"	14	"	29	284	54	284	54	" ..	194	6	90	48	" pink and white.
Brown's Rot Proof	"	14	"	30	281	36	281	36	" ..	225	..	56	36	" red.
Hale's Champion	"	14	"	24	275	..	261	15	13 45	196	35	64	40	Round white.
Maggie Murphy	"	14	"	23	243	6	243	6	None..	170	24	72	42	Long rose.
New Variety No. 1 ...	"	14	"	29	240	54	240	54	" ..	169	24	71	30	Round pale rose
Rural No. 2	"	14	"	25	238	42	238	42	" ..	180	42	58	..	Oblong white.
I X L....	"	14	"	25	235	24	235	24	" ..	164	14	71	10	Long flat pink and white.
Green Mountain	"	14	"	30	232	6	232	6	" ..	181	6	51	..	" white.
Thorburn.	"	14	"	24	228	48	228	48	" ..	114	48	114	..	Oblong pink.
Up to Date.....	"	14	"	24	225	10	225	10	" ..	191	25	33	45	Oval white.
Carman No. 3	"	14	"	25	216	42	216	42	" ..	171	..	45	42	Oblong white.

POTATOES—TEST OF FERTILIZERS.

A test was made of superphosphate of lime on three plots, and a check plot of same size was planted at the same time alongside.

The rows were two and a half feet apart and the sets one foot apart in the row. Four rows of 100 feet each were planted for each test plot and for the check plot, and the yield computed from the crop of 66 feet of the two centre rows in each case.

TEST OF SUPERPHOSPHATE OF LIME.

Name of Variety.	Planted.		Dug.		Total Yield per Acre.	Yield per Acre of Sound.	Yield per Acre of Rotten.	Yield per Acre of Market- able.	Yield per Acre of Unmar- ketable.
					Bush. Lbs.	Bush. Lbs.	Bush. Lbs.	Bush. Lbs.	Bush. Lbs.
Dakota Red, untreated.....	May	15..	Oct.	1..	355 18	355 18	None.....	320 18	35 ..
" 100 lbs. per acre.	"	15..	"	1..	371 48	371 48	"	335 18	36 30
" 150 "	"	15..	"	1..	391 36	391 36	"	350 36	41 ..
" 200 "	"	15..	"	1..	409 12	409 12	"	365 42	43 30

FODDER PLANTS.

The following fodder plants were tested again this year. The conditions here do not appear to be suitable for a heavy production of any of the millets, perhaps the cool wet weather in the early period of growth is unfavourable. All the millets were sown on May 25, on a warm loam that was in a good state of fertility and well prepared.

Plot 1.—Cat-Tail Millet :—

A poor uneven stand, stalks 24 to 28 in. long ; length of head 3 to 4 inches.
• Yield per acre when cut, 2 tons 1,440 lbs.

Plot 2.—Algerian Millet :—

An uneven stand ; stalk 36 to 38 inches long and moderately leafy, heads 3½ to 4½ inches long ; yield per acre, 3 tons 640 lbs.

Plot 3.—Italian or Indian Millet :—

Stalks 28 to 34 inches long ; heads 4 to 4½ inches ; yield per acre 3 tons 40 lbs.

Plot 4.—Moha Hungarian Millet :—

Stalks 30 to 36 inches long ; heads 3 to 4 inches ; yield per acre 2 tons 1,920 lbs.

Plot 5.—Round White Extra French Millet :—

Stalks 26 to 30 inches long ; heads 2 to 2½ inches ; yield per acre 4 tons 160 lbs.

Plot 6.—Soja Beans sown May 1 :—

Drills 21 inches apart ; length of stalk 24 to 30 inches ; very leafy and well podded, pods 1¼ in. long ; yield per acre 4 tons 40 lbs.

Plot 7.—Soja Beans sown May 1 :—

Drills 28 inches apart ; length of stalk 30 inches, very leafy and well furnished with pods ; weight per acre when cut 4 tons 760 lbs.

Plot 8.—Soja Beans sown May 1 :—

Drills 35 inches apart ; length of stalk 30 inches, very leafy and well podded, pods 1¼ in. long, and containing 2 to 3 seeds in the late dough stage when cut Oct. 4 ; yield per acre 4 tons 480 lbs.

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Plot 9.—Horse Beans planted May 1 :—

Drills 21 inches apart ; length of stalk 28 to 30 inches, not well podded and many blank pods ; length of pod 1 to $1\frac{1}{4}$ inches ; yield per acre 2 tons 1,440 lbs.

Plot 10.—Horse Beans planted May 1 :—

Drills 28 inches apart ; length of stalk 30 inches, not well podded nor were the pods plump or well filled ; yield per acre 2 tons 1,920 lbs.

Plot 11.—Horse Beans planted May 1 :—

Drills 35 inches apart ; stalks 32 inches long but very few pods ; yield per acre 2 tons 640 lbs.

DWARF ESSEX RAPE.

The plots mentioned in my report for 1901 commenced to grow vigorously in November, and made strong growth with very little interruption between the short spells of frost during the winter and furnished green feed for the sheep, which were allowed to feed off the plots alternately. The land where these plots were, gave a very much better crop this year than land alongside which was under other crops in 1901, but which was under same kind of crop this year. In one case the crop was potatoes. In 1901 the crop was rape and alongside, sunflowers, both hoed crops. In the other rape with mangels alongside. This year the potatoes were a better colour, more vigorous, and the yield considerably heavier where the sheep had pastured on the rape. In the other plots mixed grains for feed were sown over all the plots, and that on the rape plot averaged nearly one-third heavier yield than where roots had been grown. This season rape was drilled in between the rows of corn on a few plots, sown early in August, and at this date promises to give a considerable quantity of green feed for the sheep, on land that otherwise would be unproductive all winter, and judging from experience of one year it will be a decided benefit to the next crop.

SUNFLOWERS.

A plot of the Mammoth Russian sunflower was sown May 16. They grew well and made fine heads, some of which measured 15 inches across. The seed is very good feed for hens, especially in the autumn when they are moulting.

AMBER SUGAR CANE AND BROOM CORN.

A plot each of the seed of these products was sown in drills 3 feet apart and the plants thinned to about 5 inches apart in the drill. The cold wet spring delayed growth so that neither tasseled out and very few stalks grew more than $2\frac{1}{2}$ feet. These crops do not appear to be adapted to the mild moist summers of this coast.

VEGETABLES.

The cold rains in spring kept the soil cold and retarded the germination and growth of small seeds. Radishes and lettuce were not so crisp and juicy on this account.

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RADISHES.—Sown May 7.

Variety.	Fit for use.	Remarks.
Early Scarlet Turnip.....	June 5.....	Crisp and good.
Olive Shaped Scarlet	" 7	Medium crisp.
White Tipped Early Scarlet Turnip.....	" 7	Crisp and juicy.
French Breakfast.....	" 10.....	Crisp, juicy and sweet.
Forcing Olive Shaped Short Leaf	" 10	Crisp and sweet.
No Plus Ultra	" 10.....	Crisp; slightly bitter.

LETTUCE.—Sown May 7.

Trocadero Red Edged	June 20.....	Tough and bitter.
Trianon Early White	" 24.....	Medium crisp.
Cabbage, All the Year Round.....	" 20.....	Tender, crisp and good.
Cabbage, Early Ohio.....	" 10.....	Crisp, tender, very good.
Blond Stone Head Cabbage.....	" 10	Crisp and good.
Neapolitan Cabbage.....	" 7.....	Tender, sweet, very good.
Paris Green Cos.....	" 20.....	Tough and bitter.

CARROTS—Sown April 26.

Parisian Forcing.....	July 8.....	Crisp, sweet, very good.
French Horn.....	" 16	Sweet; fine flavoured.
Luc Half Long.....	" 23.....	Crisp and good.
Long Blood Red.....	" 30.....	Fine quality; good.

TURNIPS—Sown April 29.

Extra Early White Milan.....	June 16.....	Crisp, juicy, sweet, good.
Early White Strap Leaved	" 20	Crisp, juicy, sweet, fine flavour.
Early Stone.....	" 28.	Solid, crisp, sweet, good.
Robertson's Golden Ball.....	" 30.....	Very good.

CABBAGE.—Seed sown in garden April 14; transplanted May 27.

Paris Market.. ..	Aug. 8.....	Heads small but firm, white and of very good quality.
Early Jersey Wakefield.....	" 14	Heads medium size, firm, good.
Savoy Green Globe.....	" 28.....	Heads medium large, firm, solid, crisp; of very fine quality.
Early Winningstadt.....	Sept. 3.....	Heads large, solid; of very fine quality.
Large Red Drumhead.....	" 15.....	Heads medium large, very solid, crisp; good quality.
Fottler's Drumhead. . .	" 20	Heads large, solid, crisp; of fine flavour.

BROCCOLI.—Seed sown in garden April 10; transplanted May 27.

Extra Early White .. .	Sept. 28.....	Heads of medium size and good flavour, fit for use.
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BRUSSELS SPROUTS—Sown April 10; transplanted May 27.

Dwarf Improved.....	Vigorous growth, infested with aphids and unfit for use.
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CAULIFLOWER.—Sown April 14; transplanted May 27.

Selected Earliest Dwarf Erfurt.....	July 28.....	Very white, solid, crisp heads.
Snowball.....	Aug. 8.....	Very firm, solid, crisp, good.
Half Early Paris.....	" 16.....	Heads medium size, soft, open; of good flavour.

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WINTER RADISH.—Sown May 7.

Variety.	Remarks.
Winter Black Long Spanish.....	Long, crisp, good quality.
Winter Scarlet China	Medium size, crisp, pleasant, tender.

ONIONS.—Sown April 15.

Danvers Yellow Globe.....	Medium size, uniform growth, firm and solid.
Market Favourite Keeping.....	Seed did not germinate.
Large Red Wethersfield.....	Medium large, solid, mild flavour.
Paris Silverskin.....	Seed germinated poorly but those that grew were of uniform size and solid in bulb.

BEETS.—Sown April 15.

Variety.	Fit for use.	Remarks.
Egyptian.....	July 2....	Firm, dark red, sweet, good.
Nutting's Dwarf Improved	" 4....	Crisp, good colour, sweet, pleasant.
Early Blood Red Turnip	" 10.....	Quick grower, crisp and sweet.
Long Smooth Blood Red	" 29 ...	A smooth, clean root; a good keeper and of good quality.

CELERY.—Sown in hotbed April 14; transplanted to garden June 10.

Rose Ribbed Paris.....	Sept. 8.....	Crisp but not good flavour.
Paris Golden Yellow.....	" 10. ...	Crisp, sweet, good flavour.
Giant Pascal.....	" 26.....	Crisp, nutty, good.
Red Large Ribbed.....	" 26	Coarse, stringy, poor.
Dwarf White Solid.....	" 26.....	Large, firm, crisp, nutty, good.

BEANS.—Planted April 29.

Name.	Fit for Use.	Remarks.
Dwarf, Golden Skinless.....	July 14..	Stalks short, moderately productive; pods, 2 to 3½ in. long; crisp, pleasant flavour; ripe, Sept. 12.
Dwarf, Matchless.....	" 14.	Dwarf and very productive; pods, 4 to 6 in. long; crisp, sweet, pleasant flavour; ripe, Sept. 8.
Extra Early Edible Podded.. ..	" 16..	Vigorous, bushy and productive; pods, 4 to 6 in. long; crisp, good and of pleasant flavour; ripe, Sept. 4.
Dwarf, Emperor of Russia.....	" 18 .	Dwarf, bushy grower, productive; pods, 3 to 4 in. long, excellent flavour and quality; ripe Sept. 14.
Inexhaustable	" 18..	Strong, vigorous grower, productive; pods, 3 to 4½ in. long; very crisp, sweet, pleasant, good; ripe, Sept. 20.
Fame of Vitry	" 20..	Growth strong and plant productive; pods, 4 to 6 in. long; crisp, pleasant flavour, good; ripe, Sept. 10.
Dwarf, Black Speckled.....	" 26..	Strong grower, productive; pods, 3 to 5 in. long; plump, fleshy, crisp, pleasant flavour, good; ripe, Sept. 14.

GARDEN PEASE.—Sown April 21.

Name of Variety.	Fit for Use.	Size of Pea.	Length of Pod.	Remarks.
			Ins.	
American Wonder.....	June	28 Medium	2	Vines well loaded, pease very good quality, pods well filled.
Alaska.....	"	28 Small ..	3	" " "
Notts' Excelsior.....	July	2 " ..	2½	" " "
McLean's Advance.....	"	4 Medium	2½	Vines fairly well loaded, " pods not well filled.
Telephone.....	"	8 Large ..	2½	" " pods well filled.
Duke of Albany.....	"	12 " ..	3	" " "
Admiral.....	"	12 Small ..	2½	Vines well loaded, medium quality, " "
Pride of the Market.....	"	17 Large ..	3	" very fine quality, " "
Shropshire Hero.....	"	17 " ..	3	" " "
Stratagem.....	"	18 " ..	3	" " "
Heroine.....	"	16 " ..	3½	" " "
New Dwarf, Telephone..	"	10 " ..	3	" " "
Gradus.....	"	16 " ..	4	" " "
Champion of England....	"	26 " ..	3	" " "

DISTRIBUTION OF SEEDS AND SCIONS.

There is an increasing interest in this department of the work as shown by the larger demand and also by the increasing percentage of those who report the results and ask for further samples for next spring. A very widespread interest is being taken in planting nut and shade trees as evidenced by the amount of call for seeds of these useful things. The following were distributed during the past season :—

Packages of cuttings and scions.....	374
Nuts and bulbs.....	144
3 lb. samples of potatoes.....	268
3 " pease.....	123
3 " oats.....	147
3 " barley.....	113
3 " wheat.....	209
Total	1,378

CORRESPONDENCE.

Letters received, 2,586 ; letters dispatched, 2,464.

APPLES.

The crop of apples has been a fairly good one this year, and owing to favourable weather in autumn the quality has been very good. Twenty acres of land were planted during 1902 with varieties not before tested, and not more than two trees of a sort were planted in this orchard. The following fruited for the first time this year.

Beauty of Bath.—Tree a vigorous grower and a free producer. Fruit of medium size, flat, skin greenish yellow with a clear red cheek. Flesh white, firm, crisp, pleasant, mildly acid. Of good flavour ; season last of July and early in August.

Vargulek.—Tree a strong grower. Fruit of medium size, conical, skin greenish white with a red cheek and numerous streaks and splashes of red. Flesh white, tender juicy ; a mild acid with a pleasant flavour. Season August.



FOREST PLANTATION, SHOWING GROWTH OF WHITE PINE, EXPERIMENTAL FARM, AGASSIZ, B.C. —Photo. by C. E. Saunders.

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Early May.—Tree a slow grower. Fruit small oblate, skin yellowish green with a slight blush. Flesh, white, crisp, mildly sub-acid, not juicy. Flavour poor. Season August.

Family.—Tree a medium grower. Fruit of medium size, conical, skin greenish yellow, striped with red and sprinkled with yellowish dots. Flesh white, tender, moderately juicy, of a pleasant acid character and good flavour. Season August.

Jefferis.—Tree a moderate grower. Fruit of medium size, flattish, conical. Skin yellow, splashed with bright red and many whitish dots. Flesh white, tender, juicy, a mild pleasant acid, with a good flavour. Season September.

Dryden.—Tree a medium grower. Fruit above medium size, oblate. Skin yellow with a dull red cheek. Flesh white, crisp, juicy, of a mild pleasant acid character with a good flavour. Season September.

Dove.—Tree a vigorous grower. Fruit of medium size, conical. Skin yellowish white with a few stripes of bright red. Flesh white, firm, juicy, sprightly, with a pleasant flavour. Season September.

Caroline Augusta.—Tree a vigorous grower. Fruit medium to large in size, oblong, conical, ribbed and irregularly shaped. Skin greenish with splashes of dull red and many gray dots. Flesh white, firm, crisp, juicy, mildly acid, flavour pleasant. Season September.

Beauty of Kent.—Tree a vigorous grower. Fruit above medium size, roundish, tapering to calyx. Skin greenish yellow with stripes of dull red. Flesh yellowish, crisp, juicy, mildly acid and of good flavour. Season October.

Delaware Red.—Tree a poor grower. Fruit below medium size, flattish. Skin yellow with a red cheek. Flesh white, firm, not juicy, of poor quality, liable to scab. Season October.

Brabant Bellflower.—Tree a strong and spreading grower. Fruit above medium in size oblong conical. Skin yellowish white with many gray dots and striped with bright red. Flesh yellowish, firm, juicy, pleasant, mildly acid and of good flavour. Season November.

Loy.—Tree a medium grower. Fruit of medium size, round flattish, skin green with a dull red cheek. Flesh whitish, not juicy, mildly acid. Quality poor and liable to scab. Season December.

Winter Sweet Paradise.—Tree a strong grower. Fruit of medium size, roundish. Skin greenish yellow with a dull red cheek. Flesh white, juicy, sweet, fine grained with a pleasant flavour. Season November and December.

Whitman.—Tree a strong grower. Fruit above medium size, conical, skin greenish yellow with russet about the stem. Flesh white, firm, not very juicy, sweet; not of high quality. Season November and December.

Reinette Plate de Champagne.—Tree a vigorous grower. Fruit of medium size, roundish oblate. Skin greenish yellow with a few gray dots. Flesh white, juicy, firm, pleasantly acid with a rich flavour. Season December.

Reinette Thoin.—Tree a moderate grower. Fruit small conical. Skin greenish white with many gray dots. Flesh white, moderately juicy, firm, mildly acid with a pleasant flavour. Season December.

Hawthornden d'Hiver.—Tree a vigorous grower and an early bearer. Fruit of medium size, roundish, a little flattened. Skin greenish yellow with a light blush in the sun. Flesh white crisp, juicy, mildly acid with a pleasant flavour. Season November and December.

Api Noir. Tree a moderate grower. Fruit small round, flat. Skin very dark purple or nearly black. Flesh greenish white, crisp, moderately juicy with a pleasant flavour. Season December.

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Golden Reinette.—Tree a feeble grower. Fruit small, roundish. Skin smooth dull yellow with a little pale red on the cheek and patches of russet. Flesh yellow crisp, mildly acid and of fine flavour. Season December.

Reine des Reinettes.—Tree a strong grower. Fruit of medium size, conical. Skin green with a dull red cheek and many gray dots. Flesh yellowish firm crisp, moderately juicy, mildly acid with a rich pleasant flavour. Season winter.

Fenouillet Gris Anis.—Tree a moderate grower. Fruit small roundish conical. Skin greenish yellow with a little red and a few small gray dots. Flesh yellowish, firm crisp, juicy, nearly sweet of fine flavour. Season winter.

Archduke Louis.—Tree a moderate grower. Fruit small oblong conical. Skin green with a dull bronze cheek. Flesh white crisp not very juicy, mildly acid with a pleasant flavour. Season winter.

Azeroly Anise.—Tree a moderate grower. Fruit small round. Skin green with a red blush in the sun. Flesh crisp, juicy and sprightly with a pleasant flavour. Season winter.

Creme de Samogitie.—Tree a vigorous grower. Fruit of medium size, conical. Skin greenish white with a few white dots. Flesh white, firm, not juicy, a mild sub acid with a pleasant aromatic flavour. Season winter.

Duke of Devonshire.—Tree a slow grower. Fruit small to medium, in size, round. Skin yellow with a dull red cheek. Flesh yellow crisp, juicy and sweet with a fine rich flavour. Season winter.

D'Ile.—Tree a medium grower. Fruit of medium size, roundish flat. Skin greenish yellow with patches of russet about the stem and a few brown dots, a bronze cheek. Flesh white crisp, not juicy, mildly acid with a pleasant flavour. Season Winter.

Calville Boisbunel.—Tree a vigorous grower. Fruit small conical. Skin greenish yellow with a red cheek. Flesh white, moderately juicy of a pleasant sub-acid character and good flavour. Season winter.

Reinette Grise Royale.—Tree a moderate grower. Fruit below medium size, conical. Skin russet bronze. Flesh white, juicy, firm, sub-acid with a good rich flavour. Season winter.

Ridge Pippin.—Tree a moderate grower. Fruit above medium size, roundish conical, ribbed. Skin yellow with a little russet about the stem and a few reddish dots. Flesh yellow, juicy, crisp, nearly sweet, slightly aromatic. Season winter.

Golden Queen.—Tree a medium grower. Fruit below medium size, conical. Skin greenish yellow, with a clear red cheek and sprinkled with white dots. Flesh white, crisp, juicy, mildly acid and of high quality. Season winter.

Reinette de Gomont.—Tree a vigorous grower. Fruit of medium size, roundish conical. Skin greenish yellow, with a brownish red cheek and patches of russet. Flesh white, firm and juicy and liable to scab. Season winter.

Madame Galopin.—Tree a vigorous grower. Fruit above medium size, oblong, conical. Skin yellowish with a faint blush. Flesh white, crisp, juicy, nearly sweet, with a fine flavour. Season winter.

Francater.—Tree a vigorous grower. Fruit small, roundish, flat. Skin greenish yellow with a red cheek and a few whitish dots. Flesh whitish, crisp, moderately juicy, a pleasant sub-acid of good quality. Season winter.

The report on a variety of fruit is made the first season that it produces, and is only a description of the fruit for that season and should not be taken as a report on its value for this country and a guide to intending planters. I append a list of apples that are desirable in this climate, having been fruited for a number of years and found to be

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valuable in their season, and the trees vigorous and productive:—Beauty of Bath, Yellow Transparent, Duchess of Oldenburg, William's Favourite, St. Lawrence, Maiden's Blush, Hawley, Ruby Gem, Blenheim Orange, Wealthy, Mother, Ribston Pippin, Grimes Golden, Belle de Boskoop, Sutton Beauty, Jonathan, Canada Red, Cooper's Market, Salome, Stuart's Golden.

PEARS.

The pears blossomed freely, but most of the bloom fell off and the crop was light. A few varieties gave full crops. Bartlett, Dr Jules Guyot, Bosc, Boussock, Fertility and La France gave full crops, but most of the other trees gave but a few specimens, and in many cases none.

The following varieties fruited for the first time:—

Manning's Elizabeth.—Tree a moderate grower. Fruit of medium size, obtuse, pyriform. Skin a clear yellow with a bright blush. Flesh white, juicy, sweet and tender, flavour very pleasant. Season late in August.

Nina.—Tree a slow grower. Fruit small, obtuse pyriform. Skin yellow with a bronze russet cheek. Flesh yellowish, sweet, juicy, with a rich, pleasant flavour. Season August.

Beacon.—Tree a strong grower. Fruit below medium size, obtuse, pyriform. Skin clear orange yellow sprinkled with gray dots. Flesh yellowish, juicy, nearly sweet, gritty at the core, not of high quality. Season August.

Ansault.—Tree a medium grower. Fruit of medium size, roundish, oblate. Skin pale greenish yellow with patches of russet. Flesh white, fine grained, juicy, melting, sweet and of fine flavour. Season early in September.

Beurre Beucke.—Tree a strong grower. Fruit of medium size, obtuse pyriform. Skin russet green splashed with yellow and sprinkled with gray dots. Flesh white, juicy, melting, nearly sweet, with a pleasant flavour. Season last of August.

Edmunds.—Tree a strong grower. Fruit above medium size, obtuse pyriform. Skin yellow, with a dull red cheek and patches of russet and a few gray dots. Flesh white, fine grained, juicy, sweet, with a very fine flavour. Season September.

*Duchesse Precoc*e.—Tree a medium grower. Fruit of medium size, oblong pyriform. Skin a greenish yellow, with a little red on sunny side, and many gray dots. Flesh slightly coarse, juicy, slightly astringent, sweet with a pleasant flavour. Season September.

Leipsic Radish.—Tree a strong grower. Fruit small, obtuse pyriform. Skin greenish yellow, with a few russet patches and many russet dots. Flesh white, juicy, sweet, slightly granular, of medium quality. Season September.

Delices de Jodoigne.—Tree a slow grower. Fruit small, acute pyriform. Skin russet yellow with bronze reddish cheek. Flesh white, juicy, fine grained, sweet, of good flavour, but liable to crack. Season September.

Napoleon.—Tree a vigorous grower. Fruit of medium size, obtuse pyriform. Skin russet green with a bronze russet cheek. Flesh white, juicy, sweet, with a pleasant flavour. Season September.

Thirriot.—Tree a vigorous grower. Fruit large, oblong, obtuse pyriform. Skin pale greenish yellow with a few brown dots. Flesh whitish, fine grained, melting, juicy, nearly sweet, with a pleasant flavour. Season early October.

Beurre Brown.—Tree a slow grower. Fruit of medium size, oblong pear shaped, tapering to stalk. Skin bronze russet with a reddish cheek. Flesh white, juicy, buttery, mildly acid with a rich pleasant flavour. Season October.

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Dr. Lucien.—Tree a strong and vigorous grower. Fruit large, obtuse pyriform. Skin greenish yellow with many russet dots. Flesh white, juicy, fine grained, melting, with a pleasant aromatic flavour. Season October.

Madame Favre.—Tree a strong grower. Fruit medium to large, obovate obtuse. Skin dull yellow with patches of russet and many gray dots. Flesh white, juicy, not fine grained, not of fine quality. Season October.

Tougaard's Flask.—Tree a moderate grower. Fruit below medium size, oblong pyriform. Skin russet with a reddish cheek and a few brown dots. Flesh white, a little coarse, moderately juicy, slightly astringent, not high flavoured. Season October and November.

Zepherin Gregoire.—Tree a strong grower. Fruit of medium size, roundish pyriform. Skin greenish yellow with many russet dots. Flesh whitish, juicy, melting, with a pleasant flavour. Season November.

Katzinkop.—Tree a vigorous grower. Fruit large, turbinate. Skin greenish yellow with a brownish red cheek. Flesh hard, not juicy nor pleasant; only fit for cooking. Season November.

Pastor.—Tree a strong grower. Fruit above medium size. Oblong pyriform. Skin yellowish with many brown dots. Flesh juicy, melting, nearly sweet, with a pleasant flavour. Season November and December.

Orpha.—Tree a vigorous grower. Fruit of medium size, obtuse pyriform. Skin a smooth russet yellow with a few gray dots. Flesh whitish, juicy, buttery, sweet, perfumed, with a pleasant flavour. Season November and December.

Admiral Cecile.—Tree a vigorous grower. Fruit of medium size, roundish obtuse. Skin greenish yellow with a bronze russet cheek and many gray dots. Flesh white, sweet, juicy, melting, very often a little gritty at core, of pleasant flavour. Season November and December.

Col. Wilder.—Tree a strong grower. Fruit large, oblong pyriform. Skin yellow with large patches and dots of russet. Flesh whitish, juicy, sweet and good. Season November and December.

Williams' Winter.—Tree a moderate grower. Fruit of medium size, obtuse pyriform. Skin greenish yellow freely splashed and dotted with russet. Flesh white, moderately juicy, not melting. Season December and January.

PLUMS.

The plum crop, with some varieties, was an average one this season and in many other instances very light. The plum rot was very prevalent and many sorts could not be shipped on account of it. A few varieties, such as Mallard, Sultan, Lincoln, Blue Apricot of Berlin, Monarch, Anna Spath, are nearly free from the disease and others would be if not planted alongside of sorts that are very subject to it.

Berkman's.—Tree a medium grower. Fruit of medium size, heart shaped. Skin deep red with a little whitish bloom. Flesh yellow, juicy, sweet and of good flavour. Season early August.

Tragedy Prune.—Tree a vigorous grower. Fruit of medium size, roundish oval. Skin dark purple with a light bluish bloom. Flesh yellowish, juicy, sweet and good. Season August.

Monsieur jaune.—Tree a medium grower. Fruit of medium size, round with a wide shallow suture. Skin pale yellow. Flesh yellowish, juicy, sweet, tender and very pleasant. Season, August.

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Lyons Apricot.—Tree a strong grower. Fruit of medium size, oval with a shallow suture. Skin purple red with a thin whitish bloom. Flesh firm, moderately juicy, sweet and pleasant. Season August.

Prune de Delices.—Tree a vigorous grower. Fruit of medium size, oval, with a shallow suture. Skin, purple with a thin bluish bloom. Flesh greenish, firm moderately juicy, sweet and good. Season August.

Large Reine Claude.—Tree a vigorous grower. Fruit medium to large, roundish. Skin greenish white. Flesh firm, juicy, sweet and pleasant. Season September.

Hungarian Damson.—Tree a moderate grower. Fruit of medium size, oval, tapering to stem. Skin deep purple with a bluish bloom. Flesh, greenish, juicy, sweet and pleasant. Season September.

Sugar Damson.—Tree a slow grower. Fruit, small, roundish somewhat pointed. Skin deep blue with a white bloom. Flesh greenish, not juicy but sweet. Season September.

CHERRIES.

The cherry crop like that of the plums suffered from the cold wet spring and from the brown rot, as well as from wet weather when the earlier sorts were maturing, which caused them to crack. A number of the young trees blossomed but in most cases the bloom fell off. There is only one new sort to report on this year, Montmorency de Sauvigny. Tree a moderate grower. Fruit of medium size, round, compressed, stem medium and sunk in a small basin. Skin clear, glossy, red. Flesh tender, juicy, sprightly with a very pleasant flavour. Season early July.

PEACHES, APRICOTS AND NECTARINES.

As usual all these fruits bloomed freely but the trees on the mountain were the only peach trees that produced fruit. The Amsden, Foster, Early Crawford and Hilborn trees on the mountain had light crops which ripened and were very fine in quality.

ALMONDS.

These nut trees having been cared for until they were large trees and although they bloomed every year, yet failed to fruit, have been removed as useless and the land devoted to other crops.

QUINCES.

Portuguese. Tree a bushy vigorous grower; fruit large globular with a neck; skin pale golden yellow. Flesh mild flavour, good and cooks nearly crimson.

MEDLARS.

All the medlars produced a crop this year. The variety known as the large fruited is the best, the fruit being as good in quality as any and much larger and smoother.

GRAPES.

The spring was wet and cold and in consequence the grapes were so late in blooming that only a very few ripened before frost; Moore's Early and Worden (Black), Brighton, Delaware and Wyoming (Red), Diamond, Martha and Saunders Seedling No. 1 white were the only ones which ripened fruit.

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MULBERRIES.

All the mulberry trees fruited this year. New American and Downing are the largest and best sorts.

MOUNTAIN ORCHARDS.

The fruit trees on the mountain have grown well and many of the trees produced a little fruit this season. Owing perhaps to the dry August and September, the fruit was not quite so large as the same sorts grown on the level but was cleaner skinned and brighter coloured.

SMALL FRUITS.

The crop of small fruits was uniformly fairly good. The cold rains in June injured the strawberry crop somewhat, but raspberries, blackberries and currants were a good crop. The gooseberries suffered from mildew so much that the fruit was worthless except a few bushes at about 600 ft. elevation on the mountain. These, although not sprayed, have not suffered from mildew and the fruit although not so large as the same sorts grown down on the level is clean and well flavoured.

RED AND YELLOW RASPBERRIES.

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Hansel.....	June 24	Vigorous....	Small.....	Crumbly, light red, good flavour.	Moderately productive.
Phoenix.....	" 26	" ..	Large	Firm, bright red, good flavour	Productive.
White Antwerp..	" 26	Feeble.....	Small	Soft, poor quality.	Not productive.
Carter's Prolific..	" 28	Moderately vigorous.	"	Firm, sweet, not of much value.	Moderately productive.
Crimson Beauty.	" 28	" ..	Medium.....	Firm, dark red, good flavour.	" "
Yellow Antwerp.	" 28	Feeble.....	Small	Crumbly, sweet, not of much value.	Not productive.
Ballard's Perpetual.	" 30	Vigorous. .	Large medium	Crumbly, sweet, good flavour.	Productive.
New Fastolf	July 3	" ..	Large	Firm, red, sweet, good quality	"
Yellow Spineless	" 3	Feeble.....	Small medium	Soft, sweet, not good... ..	Moderately productive.
Malta.....	" 3	Moderately vigorous.	"	Soft, yellow, good flavour....	" "
Pauline.....	" 3	Vigorous....	Large medium	Crumbly, dark red, sweet, good flavour.	Productive.
Herrenhauser	" 3	" ..	Medium.....	Firm, dark red, sweet, fair flavour.	Moderately productive.
Red Perpetual.	" 3	" ..	Large	Firm, bright red, sweet, good flavour.	Productive.
Duke of Brabant	" 3	" ..	Large	Firm, bright red, sweet, good flavour.	Productive.
Nonpareil.....	" 3	" ..	Small	Not good quality.....	Not productive.
Turner.....	" 3	" ..	"	Crumbly, sweet, not much good.	Moderately productive.
Hudson River Antwerp.	" 3	Feeble.....	Very small....	Soft, red, sweet.....	" "
Thompson.. .	" 4	" ..	Small	"	Not productive.
Franconia.....	" 4	Vigorous....	"	Of no value.....	"
Northumberland	" 4	" ..	Very large....	Firm, dark red, good quality.	Productive.
Fill Basket.	" 4	" ..	Large medium	" ..	"
BelledeFontenay	" 4	" ..	Large medium	" ..	"
Champlain	" 4	Moderately vigorous.	Small	Yellow, poor quality.....	Not productive.
Battler's Giant..	" 4	Vigorous....	Medium.....	Crumbly, dark red, fair flavour.	Productive.

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RED AND YELLOW RASPBERRIES --*Continued.*

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Arnold's Hybrid.	July	4 Moderately vigorous.	Small	Crumbly, light red, not much good.	Not productive.
Red Herrenhausser.	"	4 Vigorous....	Medium.....	Firm, dark red, sweet.....	Moderately productive.
Sugar of Metz...	"	4 Moderately vigorous.	Large medium	Soft, yellow, sweet, not of much value.	Productive.
Baumforth's Seedling.	"	4 " ..	Small medium	Moderately firm, dark red, sweet, but rather flat.	Moderately productive.
Sarah.....	"	5 Vigorous....	Large medium	Firm, red, sweet, very good quality.	Very productive.
Carleton.....	"	5 " ..	Medium.....	Firm, red, sweet, good flavour.	Moderately productive.
Empire.....	"	5 Feeble.....	Small	Firm, acid, not very good....	Not productive.
Lord Beaconsfield	"	5 Vigorous....	Large	Firm, bright red, good quality.	Productive.
Golden Queen...	"	5 " ..	"	Firm, sweet, good; one of the best yellow raspberries.	"
Sharpe.....	"	5 Feeble.....	Small	Crumbly, red, sweet.....	Moderately productive.
Muriel....	"	5 Vigorous....	Large medium	Firm, dark red, good flavour.	Moderately productive.
Craig.....	"	5 " ..	Small	Rather soft, red, sweet, good flavour.	" "
Autumn Surprise	"	5 " ..	Medium.....	Soft, yellow, not very good..	" "
Knevit's Giant..	"	6 " ..	Large	Crumbly, bright red, sweet, good flavour.	Productive.
La Mercier.....	"	6 Moderately vigorous.	"	Crumbly, red, sweet, good flavour.	"
Guinea.....	"	6 Feeble.....	Small	Poor quality.....	Not productive.
Large Yellow....	"	7 Vigorous....	Large	Firm, sweet, good flavour....	Productive.
Cuthbert.....	"	7 " ..	"	Firm, dark red, sweet, good quality.	"
Garnet.....	"	7 " ..	Small	Purplish-red, poor quality....	"
Mary.....	"	7 Moderately vigorous.	"	Poor quality.....	Not productive.
Queen of the Market.	"	7 Vigorous....	Large	Firm, sweet, good quality....	Productive.
Lady Anne.....	"	7 " ..	"	Soft, yellow, not good.	"
Percy.....	"	7 Moderately vigorous.	Medium.....	Firm, purplish red, sweet....	Not productive.
Hornet.....	"	7 Feeble.....	"	Moderately firm, a little acid but fair flavour.	Moderately productive.
All Summer.....	"	7 Vigorous....	Large medium	Firm, red, sweet, continues in bearing a long time.	Productive.
Muskingum.....	"	7 " ..	Small	Crumbly, sweet, not of any merit.	Moderately productive.
Fastolf.....	"	8 Moderately vigorous.	Medium.....	Firm, red, sweet.....	" "
Marlboro'.....	"	8 Vigorous....	Very small....	"	Productive.
R. B. Whyte..	"	8 " ..	Large	Firm, dark red, good quality.	"
Clarke.....	"	8 " ..	Medium.....	Moderately firm, sweet, fair flavour.	Moderately productive.
Hebner.....	"	8 " ..	"	Soft, red, sweet, not of much value.	Not productive.
Norwich Wonder	"	8 Feeble....	Very small...	Crumbly, purplish red, poor..	"
King.....	"	8 Moderately vigorous.	Medium.....	Firm, crimson, pretty good..	Moderately productive.

RED AND YELLOW RASPBERRIES—*Concluded.*

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Chili.....	"	8 Vigorous....	Large medium	Moderately firm, sweet, good flavour.	"
French Vice-President.	"	8 " ...	Large	Firm, dark red, sweet, good quality, but adheres tightly to the core.	Productive.
Garfield.	"	8 " ...	Small	Crumbly, red, good flavour ..	Moderately productive.
Shaffer's Colossal.	"	8 " ...	Large	Firm, purplish red, acid.....	Productive.
Barnet.....	"	8 Moderately vigorous.	Small	Soft, red, sweet, not very good.	Not productive.
Queen Victoria..	"	8 Vigorous....	Large medium	Crumbly, red, fair flavour. ..	Moderately productive.
Sir John... ..	"	8 " ...	Small	Crumbly, red, acid, not of much value.	" "
Semper Fidelis..	"	8 " ...	Medium.....	Dark red, sweet, fine flavour.	Productive.
Cariboo Wild.. .	"	8 " ..	Small	Soft, acid, good flavour.....	Not productive.
Wilder.....	"	9 Moderately vigorous.	"	Not good quality.....	"
Brinkle's Orange	"	10 Vigorous....	Large medium	Soft, sweet.. ..	Productive.
Goliath.	"	10 " ...	" ..	Moderately firm, dark red, sweet, good flavour.	"
Prince of Wales.	"	10 " ...	Medium.	Firm, dark red, sweet.	Moderately productive.
Lizzie.	"	10 Feeble.....	"	Firm, red, sweet	" "
Millar	"	12 Vigorous....	"	Firm, red, sweet.....	" "
Bee Hive.	"	13 " ...	Large medium	Crumbly, sweet, good flavour	" "
Oregon Late	"	13 Moderately vigorous.	Medium.....	Firm, sweet fair flavour.....	" "
Minnie.	"	14 Feeble.....	Very small....	Crumbly, purplish red, poor..	Not productive.

RED AND WHITE CURRANTS.

Knight's Early (red.)	June 28	Moderately vigorous.	Small.....	Cluster short, fairly well filled, sweet, good quality.	Moderately productive.
La Fertile ...	July 4	Vigorous....	Medium.....	Cluster medium in length, well filled, sweet, good flavour.	"
London Red	" 4	"	Large medium	Cluster long, a pleasant acid, good quality.	Productive.
Raby Castle.....	" 4	"	" ..	Cluster long, well filled, mildly acid, good quality.	"
White Transparent.	" 4	Moderately vigorous.	Small medium	Cluster short, fairly well filled, sweet, good flavour.	Moderately productive.
La Hative.....	" 4	"	Small... ..	Cluster short, not very well filled, a pleasant acid.	"
White Gondoin..	" 4	Feeble	"	Cluster medium in length, sweet, good flavour.	"
White Dutch....	" 4	Moderately vigorous.	"	Cluster short, fairly well filled, acid, good flavour.	Not productive.
Pomona.....	" 4	Vigorous....	Large medium	Cluster long, fairly well filled, sweet, good flavour.	Productive.
White Grape....	" 4	Feeble.....	Medium.....	Cluster short, not very well filled, sweet, good flavour.	Moderately productive.
Red Cherry.....	" 4	Moderately vigorous.	"	Cluster medium in length, fairly well filled, quality good.	"

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RED AND WHITE CURRANTS — *Continued.*

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Moore's Ruby...	July	5	Moderately vigorous.	Small	Cluster short, not well filled, quality poor. Not Productive.
Large White....	"	5	"	Medium.....	Cluster medium in length, well filled, sweet, good flavour. Moderately productive.
La Conde.....	"	5	Vigorous....	"	Cluster long, fairly well filled, quality good. Productive.
Red Dutch.	"	5	Moderately vigorous.	"	Cluster short, well filled, acid but good quality. Moderately productive.
North Star.....	"	6	"	"	Cluster medium long, acid, good flavour. "
New Red Dutch.	"	6	"	"	Cluster medium in length, fairly well filled, rather acid. Productive.
Prince Albert...	"	6	Vigorous....	"	Cluster long, moderately well filled, quality good. "
Fay's Prolific....	"	6	Moderately vigorous.	"	Cluster medium in length, fairly well filled, good flavour. Moderately productive.
No. 51 L.S.....	"	6	"	Small.....	Cluster short, fairly well filled, sweet, pleasant flavour. "
Rankin's Red ...	"	7	"	"	Cluster short, not well filled, acid, pleasant flavour. Not productive.
Eyatts New White.	"	7	"	Medium	Cluster medium in length, fairly well filled, good flavour. Moderately productive.
Versailles.....	"	8	"	Small medium	Cluster medium in length, well filled, good quality. "
White Esperens.	"	8	"	Small....	Cluster short, fairly well filled, mild acid. Not productive.
Frauendorfer ...	"	8	"	Medium....	Cluster medium, not well filled, quality fair. "
Verrier's White..	"	8	Feeble.....	Small	Cluster short, not well filled, quality poor. "
Beauty of St. Giles.	"	8	"	"	Cluster short, not well filled, quality poor. "
White Cherry...	"	8	Vigorous....	Medium.....	Cluster medium in length, well filled, sweet, good quality. Productive.
English Red....	"	8	Moderately vigorous.	"	Cluster medium in length, well filled, good quality. Moderately productive.
Rouge Admirable	"	9	"	"	Cluster short, fairly well filled, mild acid, poor flavour. "
De La Rochepoze	"	9	Feeble	Small	Cluster short, not well filled, acid, fair flavour. Not productive.
La Turinaise....	"	10	Moderately vigorous.	Medium	Cluster medium in length, well filled, good quality. Productive.
Red Gondoin....	"	10	Vigorous....	"	Cluster medium in length, fairly well filled, rather acid. Moderately productive.
Champaigner....	"	10	Moderately vigorous.	"	Cluster medium in length, fairly well filled, good flavour. "
Large Red.....	"	10	"	"	Cluster medium in length, well filled, acid. "
Kaiser.....	"	10	"	Small	Cluster short, moderately well filled, sweet, good flavour. "
Large White Dessert.	"	10	"	Medium.....	Cluster medium in length, well filled, good quality. "
Large White Brandenburger	"	10	Vigorous....	"	Cluster medium long, well filled, sweet, good flavour. "
Victoria.....	"	10	"	"	Cluster medium in length, fairly well filled, mild, sweet. Productive.
White Pearl.....	"	10	"	"	Cluster medium in length, not very well filled, sweet, good flavour. "
White Imperial .	"	10	Moderately vigorous.	"	Cluster medium in length, not well filled, sweet, good quality. Not productive.
Ringen's.....	"	12	"	"	Cluster medium in length, fairly well filled, good flavour. Moderately productive.

BLACK CURRANTS.

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Dominion.....	July 10	Vigorous....	Medium.....	Cluster short, mild, good flavour.	Moderately productive.
Lennox	" 10	Moderately vigorous.	Small	Cluster short, not very good quality.	Not productive.
Merveille de la Gironde.	" 10	Vigorous ...	Medium.....	Cluster medium, slightly acid, but good flavour.	Moderately productive.
Bang Up..	" 10	Moderately vigorous.	"	Cluster long, mild, pleasant flavour.	" "
Gewohnliche.....	" 10	" ..	" ...	Cluster short, mild, fair flavour.	" "
Eclipse	" 10	" ..	Small medium	Cluster medium in length, pleasant flavour.	Productive.
Middlesex	" 10	" ..	Medium.....	" "	Moderately productive.
Stirling.....	" 10	" ..	"	Cluster medium in length, rather rank in flavour.	" "
Kerry	" 10	" ..	"	Cluster long, sweet, fine flavour.	Productive.
Boskoop Giant..	" 10	Vigorous ...	Large	Cluster long, sweet, mild flavour.	"
Perry	" 12	Moderately vigorous.	Small	Cluster short, flavour rank, acid.	Not productive.
Ruler.....	" 12	" ..	Medium.	Cluster medium in length, good flavour.	Moderately productive.
Madoc.....	" 12	" ..	Small	Cluster short, quality poor.	Not productive.
Kentish Hero. ..	" 12	" ..	Medium.....	Cluster medium in length, acid, fair flavour.	Moderately productive.
Ambrafarbige...	" 12	" ..	"	Cluster medium in length, pleasant acid, good flavour.	" "
Charmer.....	" 12	Moderately vigorous.	Small	Cluster short, quality fair.	Not productive.
Beaudry	" 12	" ..	"	Cluster short, pleasant flavour.	"
Ontario.....	" 12	Vigorous ...	Large medium	Cluster long, acid, quality fairly good.	Moderately productive.
Eagle	" 12	" ..	Medium.....	Cluster medium in length, flavour rank.	" "
Lanark.....	" 12	Moderately vigorous.	Small	Cluster short, fairly good quality.	" "
Baldwin	" 12	Feeble grower.	Medium.....	Cluster short, pleasant flavour.	Productive.
Wood.....	" 12	Vigorous ...	"	Cluster medium in length, flavour a little rank.	Moderately productive.
Louise.....	" 12	" ..	Small	Cluster medium in length, quality fairly good.	" "
Prince of Wales.	" 12	" ..	Large	Cluster long, very good flavour.	Productive.
Stewart	" 12	Moderately vigorous.	Medium.....	Cluster medium in length, pleasant flavour.	Moderately productive.
Kentville.	" 12	" ..	"	Cluster short, quality fairly good.	" "
Success.....	" 12	Feeble grower.	Small	Cluster short, sweet, mild flavour.	Not productive.
London	" 12	Vigorous ...	Medium.....	Cluster medium in length, mild, sweet.	Moderately productive.
Star	" 12	Moderately vigorous.	"	Cluster medium in length, sweet, pleasant flavour.	" "
Victoria	" 12	Vigorous ..	Large medium	Cluster medium in length, sweet, mild, pleasant flavour	Productive.
Champion....	" 12	Moderately vigorous.	" ..	Cluster medium in length, acid, but pleasant flavour.	"
Black Naples....	" 12	Vigorous....	" ..	Cluster long, sweet, pleasant flavour.	Moderately productive.
Lee's Prolific....	" 12	" ..	Medium.....	Cluster medium in length, sweet, pleasant flavour.	" "

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BLACK CURRANTS—*Continued.*

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Ethel	July 12	Moderately vigorous.	Medium.....	Cluster medium in length, pleasant, mild, acid.	Moderately productive.
Parker	" 12	" ..	Small medium	Cluster short, acid.	Not productive.
Monarch.....	" 14	Vigorous ...	" ..	Cluster short, acid, a little rank.	Productive.
Pearce.	" 14	" ..	Medium... ..	Cluster medium in length, mild, pleasant flavour.	"
Bella.....	" 14	" ..	Small	Cluster short, fair flavour.	Not productive.
Norton	" 14	" ..	"	Cluster medium in length, acid, but good flavour.	Productive.
Oxford.....	" 14	Moderately vigorous.	Small medium	Cluster medium in length, sweet, pleasant flavour.	Not productive.
Climax	" 14	Vigorous ...	Medium.....	Cluster long, medium, fairly good quality.	Productive.
Orton	" 14	Moderately vigorous.	Small	Cluster short, sweet, fair flavour.	Not productive.
Pomona	" 14	Vigorous ...	Large	Cluster long, sweet, good flavour.	Productive.
Henry	" 15	Moderately vigorous.	Medium.....	Cluster long, medium, sweet, pleasant flavour.	Moderately productive.
Hansel	" 18	" ..	"	Cluster long, medium, sweet, firm, good flavour.	Productive.

BLACK CAP RASPBERRIES.

Carman	July 6	Moderately vigorous.	Small	Quality poor.....	Moderately productive.
Smith's Prolific..	" 6	Vigorous...	Medium	"	" ..
Early Ohio.....	" 6	" ..	Small medium	Quality fair	Productive.
Cromwell.	" 6	" ..	Medium	Fairly good quality..	"
Nemaha	" 8	" ..	Large	Good quality	"
Conrath.....	" 8	" ..	Large medium	Good quality, fine flavour ..	"
Older.	" 8	" ..	" ..	Good quality.....	"
Lovett.....	" 8	Moderately vigorous.	Small medium	Fair quality	"
American Yellow Cap.	" 8	Vigorous...	Small.....	Sweet, good flavour.....	"
Kansas	" 8	" ..	Large medium	"	"
Palmer	" 9	" ..	Medium	"	"
Gregg	" 9	" ..	Large	Sweet, good quality.....	"
Progress	" 9	" ..	Medium	Good quality	"
Jackson's May King.	" 9	" ..	Small.....	Poor quality.....	Moderately productive.
Hopkins	" 9	Moderately vigorous.	"	"	" ..
Mam. Cluster...	" 12	Vigorous...	Large	Sweet, fair quality.....	" ..
Diamond.....	" 15	" ..	Small	Poor quality.....	Not productive.

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BLACKBERRIES.

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Lovett's Best....	Aug. 10	Vigorous....	Large with many small.	Glossy black, sweet, good flavour, no core.	Not productive.
Oregon Ever-bearing.	Aug. 6 to Oct. 10	" ...	Large medium	Brownish black, drupes medium and compact. Fairly good quality when fully ripe.	Very productive.
Early King	July 15	Vigorous....	"	Glossy black, firm, sweet, good quality.	Productive.
Snyder.....	" 22	" ...	"	Glossy black, drupes medium large, sweet, without a core when ripe.	"
Eldorado.....	" 22	" ...	Large	Glossy black, firm, sweet, without a core when ripe, one of the best.	"
Dallas	" 23	Moderately vigorous.	Large medium	Glossy black, with a distinct, pleasant flavour, has no core, very good.	"
Erie	" 24	Vigorous....	"	Glossy black, drupes large, sweet, fine flavour, without a core.	"
Agawam.....	" 26	" ...	Medium.....	Drupe small and compact, firm, sweet and pleasant, without a core when fully ripe.	Very productive.
Stone's Hardy ..	" 26	" ...	Large	Drupe large, fruit of a very high quality.	Productive.
Maxwell.....	" 28	" ...	"	Glossy black, thimble shaped firm, sweet, juicy, pleasant.	"
Wilson's Early..	" 28	" ...	Large medium	Berry long, drupes medium in size, sweet, pleasant flavour.	"
Ohmer	" 30	" ...	Large	Glossy black, oblong, drupes large, good flavour, slightly acid.	Moderately productive.
Brunton	" 30	Feeble growth.	Small	Not good quality...	Not productive.
Tecumseh	" 30	Vigorous....	Large medium	Glossy black, conical, drupes medium and compact, juicy sweet and pleasant, soft core.	Productive.
Kittatinny. ...	" 31	" ...	Small and large	Glossy black, drupes large, sweet, good, core small.	Moderately productive.
Crystal White...	Aug. 6	" ...	Small	Glossy black, sweet and pleasant to taste, but too small and imperfect.	" "
Lawton.....	" 6	" ...	Large	Glossy black, sweet	" "
Minnewaska	" 6	" ...	Medium ...	Glossy black, drupes large, sweet.	" "

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METEOROLOGICAL RECORD.

Date of Highest Temperature.	Degrees.	Date of Lowest Temperature.	Degrees.	Rainfall.	Snowfall.	Sunshine.	
				Inches.	Inches.	Hours.	Minutes.
1901.		1901.					
December 24... ..	48	December 12.....	25	4.76	.....	49	54
1902.		1902.					
January 14.....	49	January 25.....	1	2.88	8	72	54
February 15... ..	58	February 1 and 2.	22	6.46	2	45	24
March 31... ..	60	March 27.....	26	5.55	.....	68	06
April 11.....	70	April 4.....	30	3.05	.....	104	36
May 26.....	87	May 4-12-23-30....	40	4.17	.....	93	36
June 21.	89	June 30.. ..	45	2.43	.....	141	24
July 19.....	95	July 12.....	46	2.58	.....	170	54
August 6..	86	August 27.....	38	3.30	.....	239	00
September 13.....	84	September 26.....	37	2.79	.....	141	42
October 2 and 7.....	67	October 17.....	36	3.55	.....	118	
November 3 and 4,...	58	November 8 and 20	26	8.62	12	27	
		Totals... ..		53.54	22	1,272	30

This record, as compared with preceding years, shows that the season has been about an average one in rainfall, temperature and sunshine.

I have the honour to be, sir,

Your obedient servant,

THOS. A. SHARPE.

STATEMENT OF EXPENDITURE ON THE DOMINION EXPERIMENTAL
FARMS FOR THE YEAR ENDING JUNE 30, 1902.

CENTRAL EXPERIMENTAL FARM—EXPENDITURE, 1901-1902.

Live stock, including special importation of dairy animals.....	\$ 7,900 26
Feed for stock, including supplies from experimental plots, \$530.69; also veterinary services.....	3,759 85
Seed grain, seeds, trees, &c.....	1,235 33
Implements, tools, hardware and supplies.....	1,110 58
Drainage and drain tiles.....	1,288 67
Manure and fertilizers for experimental plots and horticultural department.....	180 04
Travelling expenses.....	1,776 49
Exhibition expenses, including value of grain held over for ex- hibitions.....	520 80
Blacksmithing, harness supplies and repairs.....	1,124 64
Bee department.....	189 73
Salaries of officers engaged in the general work of the farms, propor- tion chargeable to the Central Farm.....	1,935 48
Wages, farm work, including experimental work with grain and other farm crops ; also salaries of officers in charge.....	6,058 73
Wages, care of stock.....	2,612 27
Chemical division, proportion chargeable to the Central Farm....	1,247 60
Botanical and Entomological division, proportion chargeable to the Central Farm.....	1,312 60
Horticultural division, including salary of officer in charge.....	5,094 13
Poultry division, including all supplies ; also salary of officer in charge....	2,111 29
Forestry division and care of grounds.....	1,407 11
Arboretum, including drawing and spreading of 520 loads of gravel on roads.....	1,973 99
Distribution of trees and tree seeds, including \$20.40 value of tree seeds supplied by Brandon and Indian Head Farms.....	107 70
Office help, correspondence branch and messenger service.....	3,905 41
Printing of office supplies and stationery....	1,012 39
Seed testing and care of greenhouses.....	1,126 39
Dairy branch, including wages of dairyman.....	800 79
Contingencies, including \$725.11 for 590 loads gravel and work on roads....	1,184 01
Books and newspapers.....	86 82
Telegrams and telephones..	238 69
Steers purchased for feeding experiments.....	3,366 89
	<hr/>
	54,668 68
LESS—Proceeds of sale of steers purchased for feeding experiments..	6,060 81
	<hr/>
	\$ 48,607 87

EXPERIMENTAL FARM, NAPPAN, N.S., EXPENDITURE. 1901-1902.

Live stock, including special importation of dairy animals.....	1,429 39
Feed for stock, including veterinary services.....	2,685 47
Seed grain, seeds, trees, &c.....	371 09
Implements, tools, hardware and supplies..	311 97
Manure and fertilizers.....	191 67
Travelling expenses.	127 41
Exhibition expenses.....	151 29
Blacksmithing, harness supplies and repairs	124 26
Salary of Superintendent, including proportion of salaries for general work, Ottawa.....	2,579 02
Wages, farm work, including experimental work with farm crops...	2,554 20
Wages, care of stock.....	1,410 00
Chemical division, proportion chargeable to each branch farm	727 75
Botanical and Entomological division, proportion chargeable to each branch farm.....	539 59
Poultry branch.....	104 09
Horticultural division, including experimental work with vegetables, fruits, forest and ornamental trees and flowers; also care of grounds and salary of officer in charge.....	1,356 80
Distribution of seed grain, potatoes, &c.....	203 29
Contingencies, including postage, \$42; mail delivery, \$97.50....	182 37
Printing and stationery ...	30 42
Books and newspapers.....	21 50
Telegrams and telephones	53 85
Steers purchased for feeding experiments.....	720 00
Drainage and drain tiles.....	102 00
	15,977 43
LESS—Proceeds of sale of steers purchased for feeding experiments.	1,441 00
	14,536 43

EXPERIMENTAL FARM, BRANDON, MANITOBA—EXPENDITURE, 1901-2.

Live stock.....	43 60
Feed for stock, including veterinary services.....	125 25
Seed grain, trees, seeds, &c.....	138 67
Implements, tools, hardware and supplies	607 51
Travelling expenses	72 95
Exhibition expenses.....	246 70
Blacksmithing, harness supplies and repairs	425 02
Bee department.	20 82
Salary of Superintendent, including proportion of salaries for general work, Ottawa.....	2,629 02
Wages, farm work, including experimental work, with farm corps, &c.	3,267 96
Wages, care of stock.....	953 75
Chemical division, proportion chargeable to each branch farm.....	727 75
Botanical and Entomological division, proportion chargeable to each branch farm	539 59
Horticultural branch, including experiments with vegetables, fruits and flowers, also care of Arboretum and grounds.....	381 11
Forestry branch, including care of hedges.....	596 50
Poultry branch.....	63 50
Office help, including delivery of mail, \$143	766 50
Distribution of seed grain, potatoes, &c.....	746 91
Distribution of trees and tree seeds.....	441 70
Contingencies, including postage, \$80.....	147 58
Printing and stationery.....	25 54
Books and newspapers.....	28 50
Telegrams and telephones	80 86
Steers purchased for feeding experiments	385 93
Drainage and drain tiles.....	24 00
Manure and fertilizers.....	15 00
	\$ 13,502 22
LESS—Proceeds of sale of steers purchased for feeding experiments.	\$ 858 64
Value of grain supplied for seed distribution at Ottawa.....	319 09
	1,177 73
	\$ 12,324 49

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EXPERIMENTAL FARM, INDIAN HEAD, N.W.T. — EXPENDITURE, 1901-2.

Live stock.....	41 40
Feed for stock, including veterinary services.....	114 10
Seed grain, seeds, trees, &c.....	143 73
Implements, tools, hardware and supplies.....	507 07
Travelling expenses.....	70 25
Exhibition expenses.....	76 90
Blacksmithing, harness supplies and repairs.....	194 65
Salary of Superintendent, including proportion of salaries for general work, Ottawa.....	2,629 02
Wages, farm work, including experimental work with farm crops...	4,034 75
Wages, care of stock....	871 50
Chemical division, proportion chargeable to each branch farm	727 75
Botanical and Entomological division, proportion chargeable to each branch farm.....	539 58
Horticultural branch.....	441 21
Poultry branch	62 95
Forestry branch, including hedges.....	233 50
Office help, including delivery of mail	600 00
Distribution of seed grain, potatoes, &c.	550 44
Distribution of trees and tree seeds.....	258 15
Contingencies, including postage, \$119.44.....	199 81
Printing and stationery.....	147 50
Telegrams and telephones	42 72
Books and newspapers.	12 75
Steers purchased for feeding experiments.....	511 07
	<hr/>
	\$ 13,010 80
LESS—Proceeds of sale of steers purchased for feeding experiments.....	\$ 1,185 15
Value of grain supplied for grain distribution at Ottawa.....	1,316 89
	<hr/>
	2,502 04
	<hr/>
	\$ 10,508 76

EXPERIMENTAL FARM, AGASSIZ, B.C.—EXPENDITURE, 1901-1902.

Live stock, including special purchase of short horn cattle in Ontario	1,238 84
Feed for stock, including veterinary services	50 98
Seed grain, seeds, trees, &c.....	206 68
Implements, tools, hardware and supplies	319 90
Manure and fertilizers	102 70
Travelling expenses.....	179 20
Exhibition expenses.....	141 61
Blacksmithing, harness supplies and repairs.....	122 02
Salary of Superintendent, including proportion of salaries for general work, Ottawa.....	2,579 02
Wages, farm work, including experimental work with farm crops, vegetables, fruit trees, vines, &c	3,122 37
Wages, care of stock.....	504 40
Chemical division, proportion chargeable to each branch farm.....	727 75
Botanical and Entomological division, proportion chargeable to each branch farm	539 58
Poultry branch	99 48
Forestry branch, including care of hedges	215 40
Office help.	120 00
Distribution of seed grain, potatoes, &c.....	135 87
Distribution of trees and tree seeds	17 89
Clearing land.....	514 65
Contingencies, including postage, \$78.81	134 13
Printing and stationery	36 41
Books and newspapers	23 00
Telegrams.....	0 50
Drainage and drain tiles.....	60 00
	<hr/>
	11,192 38
LESS—Proceeds of sale of steers purchased in 1900 for feeding experiments	393 35
	<hr/>
	\$ 10,799 03

SUMMARY OF EXPENDITURE, 1901-1902.

Central Experimental Farm.....	\$ 48,607 87
Nappan " 	14,536 43
Brandon " 	12,324 49
Indian Head " 	10,508 76
Agassiz " 	10,799 03
Distribution of seed grain, potatoes, &c., from Central Experimental Farm, including value of grain supplied from Brandon and Indian Head Experimental Farms.....	5,223 42
Printing bulletins and distribution of bulletins and reports	\$4,000 00
LESS special sum in estimates for this item.....	4,000 00
	<hr/>
	\$ 102,000 00

SUMMARY OF STOCK, MACHINERY, IMPLEMENTS, &c., ON HAND
DECEMBER 31, 1902.

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

18 Horses.....	\$ 2,500 00
11 Ayrshire cattle.....	1,900 00
12 Guernsey cattle.....	1,655 00
11 Durham cattle (Shorthorns)	2,450 00
5 Canadian cattle.....	650 00
21 Grade cattle.....	875 00
43 Yorkshire swine.....	731 00
21 Berkshire swine	485 00
12 Tamworth swine.....	200 00
15 Grade swine.....	120 00
16 Large black swine	167 50
16 Shropshire sheep.....	770 00
10 Leicester sheep.....	255 00
3 Grade sheep.....	15 00
Farm machinery and implements.....	2,811 25
Vehicles, including farm wagons and sleighs.....	1,228 70
Hand tools, hardware and sundries	1,216 00
Harness.....	556 95
Dairy department, machinery, &c.....	524 50
Horticultural and forestry departments, implements, tools, &c.....	582 35
Botanical department, implements, tools, &c.....	7 65
Poultry department, 282 fowls.....	196 00
Poultry department, implements, furnishings, &c.....	93 52
Bees and apiarian supplies.....	454 10
Chemical department, apparatus and chemicals	1,670 00
Books in several departments	398 30
Greenhouse plants, supplies, &c.....	1,914 00
Furniture at Director's house.....	1,100 00
Office furniture and stationery.....	1,170 95
	<hr/>
	26,497 77

EXPERIMENTAL FARM, NAPPAN, NOVA SCOTIA.

7 Horses.....	\$ 895 00
4 Guernsey cattle.....	760 00
4 Holstein cattle.....	275 00
11 Ayrshire cattle	785 00
2 Jersey cattle.....	150 00
47 Grade cattle.....	1,390 00
3 Yorkshire swine.....	65 00
3 Berkshire swine	70 00
1 Tamworth pig	25 00
53 Grade swine	380 00
17 Sheep.....	264 00
30 Fowls.....	27 00
Bees and apiarian supplies.....	27 40
Vehicles, including farm wagons and sleighs	310 00
Farm machinery.....	526 00
Farm implements.....	178 00
Hand tools, hardware and sundries.....	333 20
Harness.....	171 50
Furniture for reception room and bedroom for visiting officials.....	155 00
Furniture supplies and books for office.....	90 00
	<hr/>
	6,877 10

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EXPERIMENTAL FARM, BRANDON, MANITOBA.

12 Horses.....	\$ 1,100 00
3 Ayrshire cattle.....	110 00
4 Durham cattle.....	425 00
2 Guernsey cattle.....	50 00
5 Grade cattle.....	277 00
1 Tamworth pig.....	15 00
10 Berkshire swine.....	75 00
12 Yorkshire swine.....	67 00
11 Grade swine.....	36 00
85 Fowls.....	85 00
Bees and apiarian supplies.....	123 95
Vehicles, including farm wagons and sleighs.....	430 00
Farm machinery.....	1,212 00
Farm implements.....	701 00
Hand tools, hardware and sundries.....	666 50
Harness.....	218 50
Furniture for reception room and bedroom for visiting officials.....	161 55
Furniture supplies and books for office.....	286 30
	<hr/>
	6,039 80

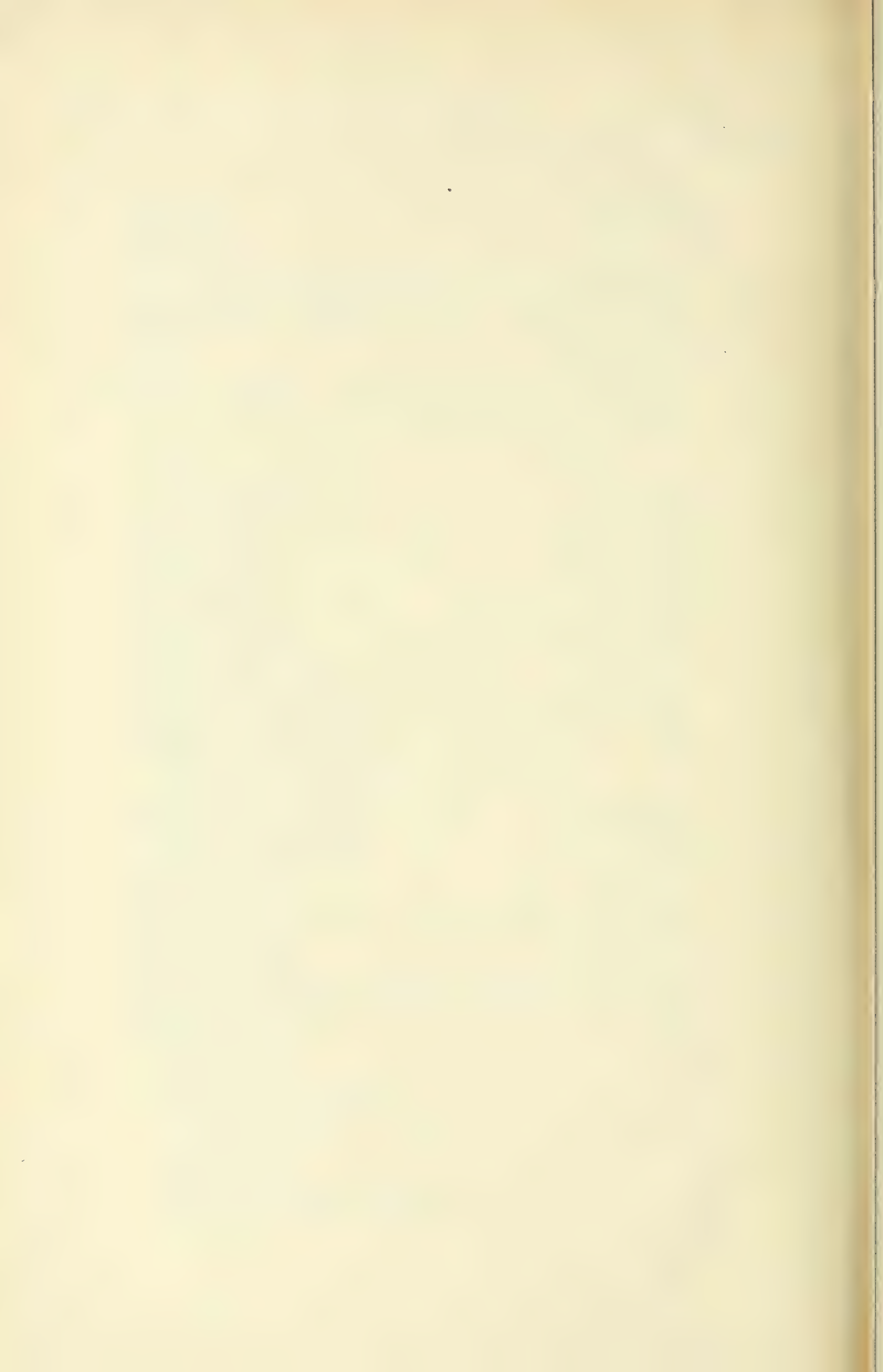
EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.

13 Horses.....	\$ 1,280 00
1 Ayrshire bull.....	75 00
17 Durham cattle.....	1,520 00
1 Guernsey bull.....	75 00
17 Grade cattle.....	545 00
10 Berkshire swine.....	105 00
11 Tamworth swine.....	128 00
2 Yorkshire White swine.....	45 00
73 Fowls.....	60 50
Bees and apiarian supplies.....	33 75
Vehicles, including farm wagons and sleighs.....	576 00
Farm machinery.....	1,094 15
Farm implements.....	735 50
Hand tools, hardware and sundries.....	590 60
Harness.....	144 00
Furniture for reception room and bedroom for visiting officials.....	217 50
Furniture supplies and books for office.....	370 00
	<hr/>
	7,595 60

EXPERIMENTAL FARM, AGASSIZ, B.C.

6 Horses.....	\$ 725 00
15 Durham cattle.....	1,020 00
2 Grade cattle.....	50 00
16 Dorset horned sheep.....	192 50
7 Berkshire swine.....	80 00
1 Tamworth sow.....	25 00
1 Yorkshire White boar.....	35 00
63 Fowls.....	48 00
Bees and apiarian supplies.....	115 75
Vehicles, including farm wagons.....	220 00
Farm machinery.....	540 50
Farm implements.....	112 50
Hand tools, hardware and sundries.....	168 45
Harness.....	95 75
Furniture for reception room and bedroom for visiting officials.....	173 90
Furniture supplies and books for office.....	135 00
	<hr/>
	3,737 35

THOS. M. CRAMP, *Accountant.*



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